DS-02
UNIVERSAL DESIGN STANDARD

Version 2.0

September 2024

Metrolinx Design Standards
Design Standard DS-02
Universal Design Standard
Publication Date: September, 2024

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PREFACE

Universal design is the practice of design to accommodate the widest variety and number of customers throughout their life span. Universal Design is a fundamental condition of good design that reflects the diversity of people who use it and does not impose barriers of any kind. By applying innovative universal design solutions and adopting a user-centered approach, Metrolinx strives for inclusivity, safety, equity and ease of movement for all.

The Regional Transportation Network serves a variety of users with diverse needs. The diversity of those using the region's transportation system every day includes customers of all ages and abilities, with different levels of familiarity with the system, with different trip purposes and traveling with luggage, strollers, bicycles or other items. Considering the range of customers who will use a station or terminal and their varying needs and abilities, throughout the design process, ensures a responsive design that is welcoming, accessible, safe, usable and convenient to all.

PURPOSE

The purpose of this Standard is to bring consistency to the user experience, maximize independent access and increase safety for customers with disabilities. The consistent application of the Universal Design Standard to the design of stations, terminals, and customer-facing facilities will allow Metrolinx to elevate the customer experience, remove barriers, and promote a seamless transit experience for persons with disabilities in a way which benefits everyone.

Under the Metrolinx Accessibility Policy, a disability is defined as any degree of physical disability, infirmity, malformation or disfigurement that is caused by bodily injury, congenital disorder or illness and includes diabetes, epilepsy, a brain injury, any degree of paralysis, amputation, lack of physical coordination, blindness or visual impediment, deafness or hearing impediment, muteness or speech impediment, or physical reliance on a guide dog or other animal or on a wheelchair or other assistive appliance or device; a condition of mental health or a developmental disability; a learning disability, or a dysfunction in one or more of the processes involved in understanding or using symbols or spoken language; and/or a mental health disorder.

PRINCIPLES FOR UNIVERSAL DESIGN

The universal design philosophy is structured around the following key principles:

- **Equitable use –** equitable use is defined as equivalent access and experience to a space, service or facility for all user groups. Equitable use means that customers, especially those with disabilities do not have to undertake additional actions or measures to receive the same level of service or experience as others.

  Guidelines that underpin a principle of equitable use would be to:

  a) provide the same means of use for all users; identical when possible, and equivalent when not; and,

  b) avoid segregating or stigmatizing any users;

  c) provisions for privacy, security and safety should be equally available to all users, and

  d) make the design appealing to all users.

- **Flexibility in use –** offers choice for different user groups where a single design solution may not work for everyone and provides spaces, services and facilities that are adaptable and can accommodate change overtime.

- **Legibility and consistency –** spaces and services that are easy to use and understand by applying consistent design treatments that provides a recognizable and intuitive customer experience.

- **Tolerance for user error –** design that is safe to use and minimizes the risk of unintentional actions.

- **Low effort –** designs that are efficient, easy and comfortable to use, minimizing fatigue for the user groups.

- **Inclusivity –** acknowledges diversity and difference and responds to people's needs and preferences.

- **User-centered design –** puts people at the heart of the design process, ensuring they can use transportation services safely, easily and with dignity.

This Standard is a "living document", evolving over time. The Universal Design team will review this document regularly to reflect changes in legislation, technological advancement and emerging best practices, as well as to reflect corporate direction and business needs.

REGULATORY AND LEGISLATIVE FRAMEWORK

Overall, the Metrolinx Universal Design Standard goes above and beyond the minimum Provincial legislated requirements, representing a "best practice" approach providing universal design for customers across rail, bus and rapid transit modes of travel. In addition, the

development of this Standard addressed the regulatory and legislative framework, which is in place to enforce accessibility for all.

It is required that each project is designed in accordance with current version of all applicable standards, regulations, and codes to the approval of all authorities having jurisdiction. Where accessibility requirements vary between documents, the most stringent requirements providing the most inclusive/Accessible solution shall apply. Relevant legislation includes:

- Accessibility for Ontarians with Disabilities Act (AODA).
- The Ontario Human Rights Code (OHRC).
- Ontario Building Code.
- Applicable standards, regulations, and codes to the approval of all authorities having jurisdiction.

Where standards, regulations and authorities having jurisdiction provide a dimension greater than those identified in the DS-02, the design team is encouraged to raise the condition with the Metrolinx Universal Design team for review.

RELATIONSHIP TO OTHER METROLINX STANDARDS

The Universal Design Standard is intended to support other standards published by Metrolinx which stipulate other specific requirements. Metrolinx Standards that shall be adhered to include, but not limited to:

- DS-03 Wayfinding Design Standard
- DS-04 GO Station Architecture Design Standard
- DS-07 Bike Infrastructure Design Standard
- DS-09 Subway Station Architecture Design Standard
- DS-12 Pedestrian Flow Modelling Design Standard
- DS-13 LRT Architecture Design Standard
- DS-27 Bus Rapid Transit (BRT) Architecture Design Standard
- GO Design Requirements Manual (DRM)

EXTERNAL REFERENCE DOCUMENTS

This Standard has been developed to consider the best practices outlined in the following documents:

- The 7 Principles - Centre for Excellence in Universal Design, National Disability Authority in Ireland
- Center for Inclusive Design and Environmental Access, "Anthropometry of Wheeled Mobility Project", (in relation to the 'Human Factors' section relating to wheelchair user dimensions).
- CSA B651 - Accessible Design for the Built Environment.
- ISO 21542 Building construction - Accessibility and usability of the built environment.
- ISO 23599 – Assistive Products for Blind or Vision-Impaired Persons – Tactile Walking Surface Indicators.
- Clearing Our Path – universal design recommendations for customers with vision loss, CNIB.

SCOPE AND APPLICATION

The Universal Design Standard identifies key universal design requirements and design guidelines to be applied by consultants, designers, architects and contractors to transit projects planned, designed and built by Metrolinx, including GO Transit, UP Express, PRESTO and Rapid Transit projects, such as Light Rail Transit (LRT) and Bus Rapid Transit (BRT).

Transportation services and facilities are deemed "accessible" when customers of all abilities can easily access and egress the same infrastructure and services with a similar level of convenience, safety and dignity in conformance with this Standard.

The Universal Design Standard is:

- Mandatory for the design of new construction and redevelopment of existing stations, terminals, stops and customer-facing facilities.
- Intended to be applied to the greatest extent possible for retrofit, and state of good repair capital infrastructure programs to existing stations, terminals, stops and customer-facing facilities.

This Standard is not applicable to the following spaces and areas:

- Service areas and staff back-of-house;
- Equipment service rooms or spaces; and,
- Any station area with restricted access to customers.

The approach for universal design needs to be an integral part of the design process, from concept to completion, as well as part of the ongoing management and operations of stations and terminals. For new and current infrastructure projects, there is a process of review by the Design Division to manage design and ensure adherence to Design Division requirements, including this Standard.

The Universal Design Standard serves as a framework to guide the incorporation of accessibility through Universal Design into Metrolinx projects. The Standard applies to a wide range of designs and sites, but cannot anticipate every possible design scenario. However, then intent of the accessibility requirements are to be met. Therefore, the Universal Design team will introduce site specific requirements into project agreements. The Universal Design team is available to provide clarification where a proposed or intended design is not reflected in this Standard.

INTEGRATED NETWORK OF SERVICES FOR THE REGION (SPECIALIZED AND CONVENTIONAL)

Metrolinx is working together with municipal partners across the Greater Toronto and Hamilton Area (GTHA) and the Greater Golden Horseshoe Region to foster a broader universally accessible network of conventional transit and specialized transit systems, where customers can transfer easily and conveniently between services, including for

cross-boundary trips. With this Standard, Metrolinx strives to plan, design and build integrated and universally accessible transportation systems, with a focus on ensuring travelling across the region, is seamless, convenient, intuitive and easy to use for all customers.

DESIGN STANDARDS

1 REACH AND SPACE RANGES

1.1 GENERAL REQUIREMENTS

There are often large differences in the space requirements and in the functional abilities of people using manual wheelchair, power wheelchair and scooter, and other mobility aids. This standard incorporates more generous space requirements, particularly related to knee and toe clearances, maneuvering clearances, reach limits, and unobstructed width of pedestrian circulation routes to ensure customers of all abilities can safely and independently access transportation services.

1.2 WHEELCHAIR USERS

a) Turning spaces shall be level, clear of all obstructions (including door swings) and shall be designed with a minimum clear 2000mm diameter at areas such as corridors, passageways, and vestibules.

b) Amenities shall be designed with consideration of the following parameters:

1. An average occupied height of a wheelchair user (average taken across manual chairs, power chairs and scooter users) is typically between 1000-1513mm, with 1360mm being the 90th percentile; average eye level is between 898–1387mm, with 1248mm being the 90th percentile;
2. Manual wheelchair users:
   i) Occupied height between 1020–1459mm, with 1347mm being the 90th percentile;
3. Power chair users:
   i) Occupied height between 1000–1492mm, with 1373mm being the 90th percentile; and,
   ii) Eye level between 932–1365mm, with 1261mm being the 90th percentile.
4. Scooter users:
   i) Occupied height between 1218–1513mm, with 1434mm being the 90th percentile; and,
   ii) Eye level between 1093–1387mm, with 1324mm being the 90th percentile.

Ensure that as a minimum, the average dimensions are met when designing fixtures and amenities that require a front approach, for wheelchair users, to complete a task. This approach accommodates a suitable median regardless of chair type.

c) Knee height of a wheelchair user is typically between 500-680mm. For amenities, requiring front approach, the knee clearance shall be:

1. Height: Between 680mm and 900mm high, measured from the floor.

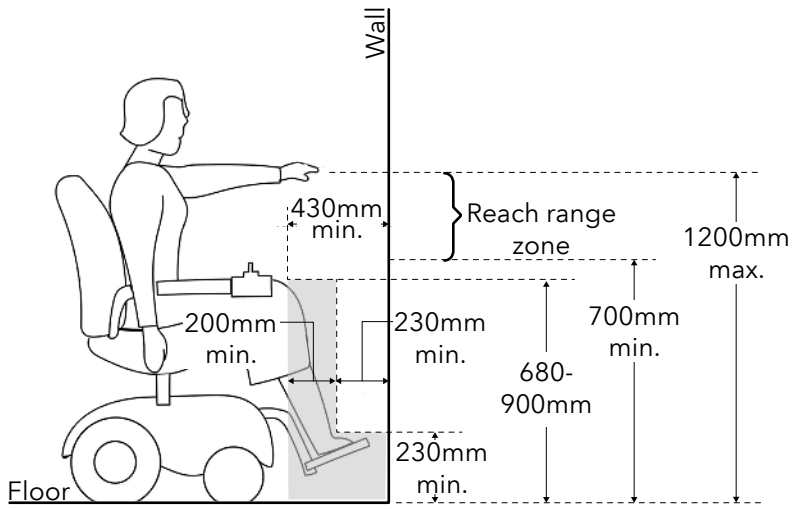

Figure 1a: Forward Reach Clear

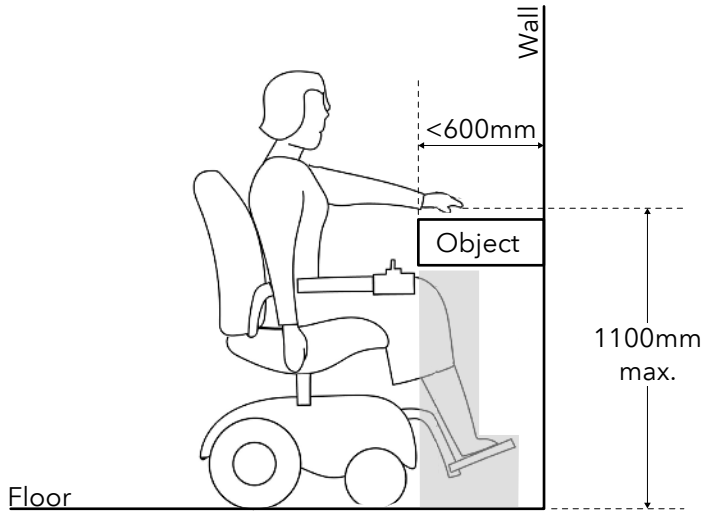

Figure 1b: Forward Reach Over Object

2. Depth: Minimum 200mm measured from the leading edge of the toe clearance; and,
3. Width: 750mm minimum.

d) Toe clearance spaces shall be provided to accommodate sufficient space for access to services and facilities:
   1. Depth: Minimum 230mm measures from the back of the knee clearance to the wall or obstruction;
   2. Height: Minimum 230mm measured from the floor; and,
   3. Width: 750mm minimum.

e) Seat height of a wheelchair user is typically between 460-490mm. Design of any seating facilities for wheelchair users shall comply with these parameters.

f) Where controls are provided, they shall be at least 1000mm from any inside corners and return walls to allow sufficient space for both left-handed and right-handed users to access services.

1.3 FORWARD REACH FOR ALL USERS

Forward approach at amenities such as wall mounted and freestanding information kiosks, touch screens, service counters and sinks, is a crucial factor to allow users to reach targets or complete a task.

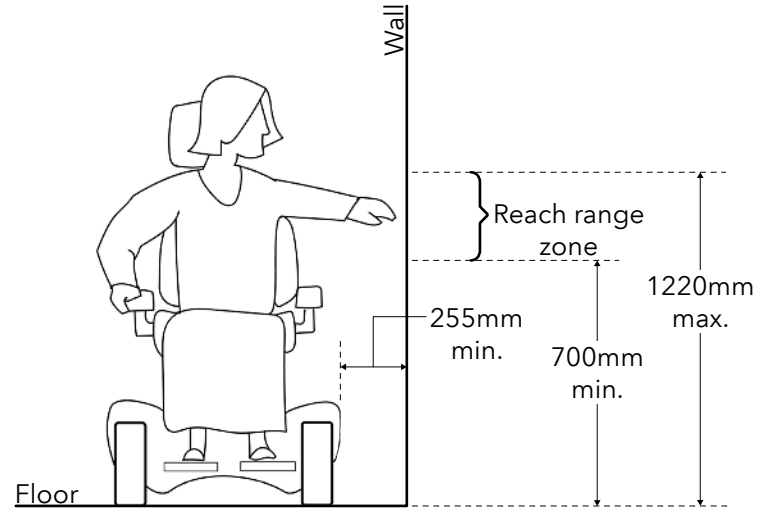

Figure 2a: Side Reach Clear

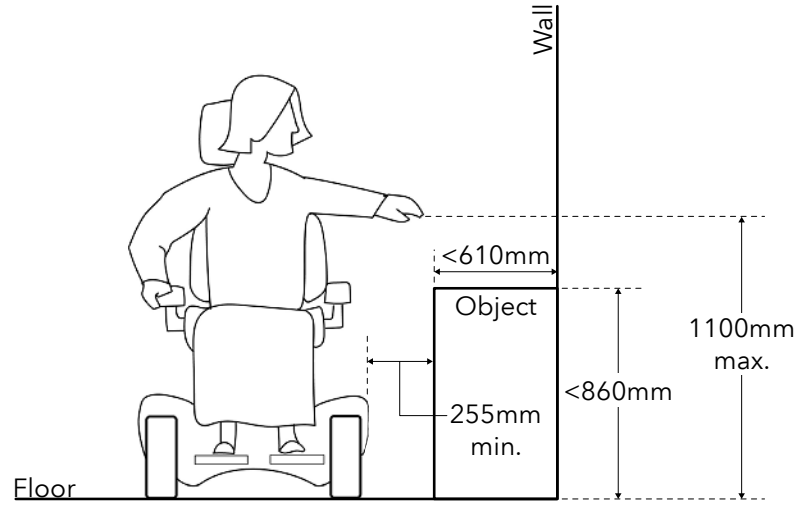

Figure 2b: Side Reach Over Object

a) If knee and toe clearances allow forward approach to an object, the upper limit to reach along the plane of the interior most point shall be 1200mm. The minimum low limit to reach to a target location shall be 700mm above the floor. (**See Figure 1a**).

b) Where a forward reach is obstructed (**See Figure 1b**):

   1. The obstruction depth shall not exceed 600mm;
   2. The reach target height shall not exceed 1100mm above the floor.

An example of where this may be applicable is at a sink where the faucet and soap dispenser must be located at an accessible reach for all users to use.

c) Where reaching is critical, the clear floor space in accordance with turning space requirements shall be provided to allow sufficient space to maneuverer.

1.4 SIDE REACH FOR ALL USERS

Side reach is important where knee and toe clearance is not, or cannot, be provided – e.g. for SFTP (Station Fare Transaction Processor), TVM (Ticket Vending Machines) and AVM's (Add Value Machines).

a) When the design allows parallel approach to an object (**See Figure 2a**):

   1. The upper limit to reach a target location shall be 1220mm;

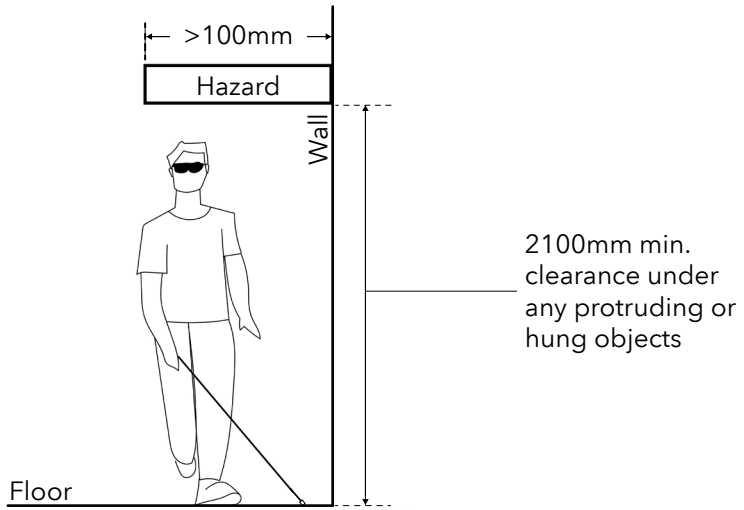

Figure 3a: Overhead Objects

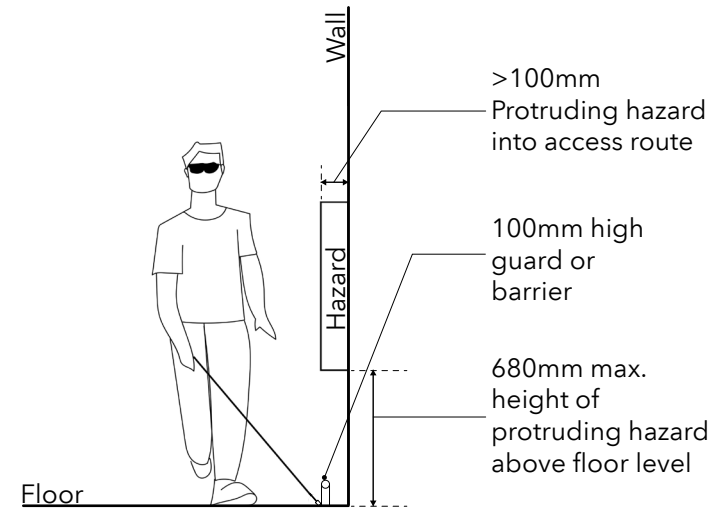

Figure 3b: Protruding Objects

2. the low limit to reach to a target location shall be 700mm above the floor; and,
3. the edge of the clear floor space shall begin no more than 255mm from any obstruction.

b) Where a side reach is over an obstruction (**See Figure 2b**):

1. The obstruction shall be no higher than 860mm and no deeper than 610mm; and,
2. The reach target height shall be 1100mm above the floor.

c) An adjacent clear floor space of minimum 2000mm by 2000mm, shall be provided and centered on the target. This will allow almost all device users to position themselves close to the target and enough leeway for most device users to align their shoulder close to an axis on the target.

1.5 HAZARD DETECTION

a) Where an accessible route is immediately adjacent to a vertical drop between 75 and 600mm deep, there shall be edge protection in the form of a barrier at ground surface level with a minimum height of 100mm. Where greater than 600mm, be provided with a guard in accordance with the Ontario Building Code.

b) In pedestrian areas, any objects attached to or suspended from a ceiling shall have their undersides at a height of at least 2100mm from the floor. (**See Figure 3a**).

c) Protruding objects shall be located within the detection range of a long white cane positioned with their lowest leading edge at or below 680mm from the floor. (**See Figure 3b**).

d) Any objects projecting into a pedestrian route more than 100mm from the vertical plane at a height of between 680-2100mm above ground level shall include a rail or other barrier with a leading edge that is cane-detectable around the object. Recessing an object avoids creating a protrusion hazard.

1.6 WIDTH REQUIREMENTS FOR DIFFERENT USERS

a) To accommodate width requirements for different users, a minimum clear width of 1800mm shall be provided for all pedestrian circulation routes. Where space permits, a minimum of 2000mm clear width is preferred. (**See Figure 4**).

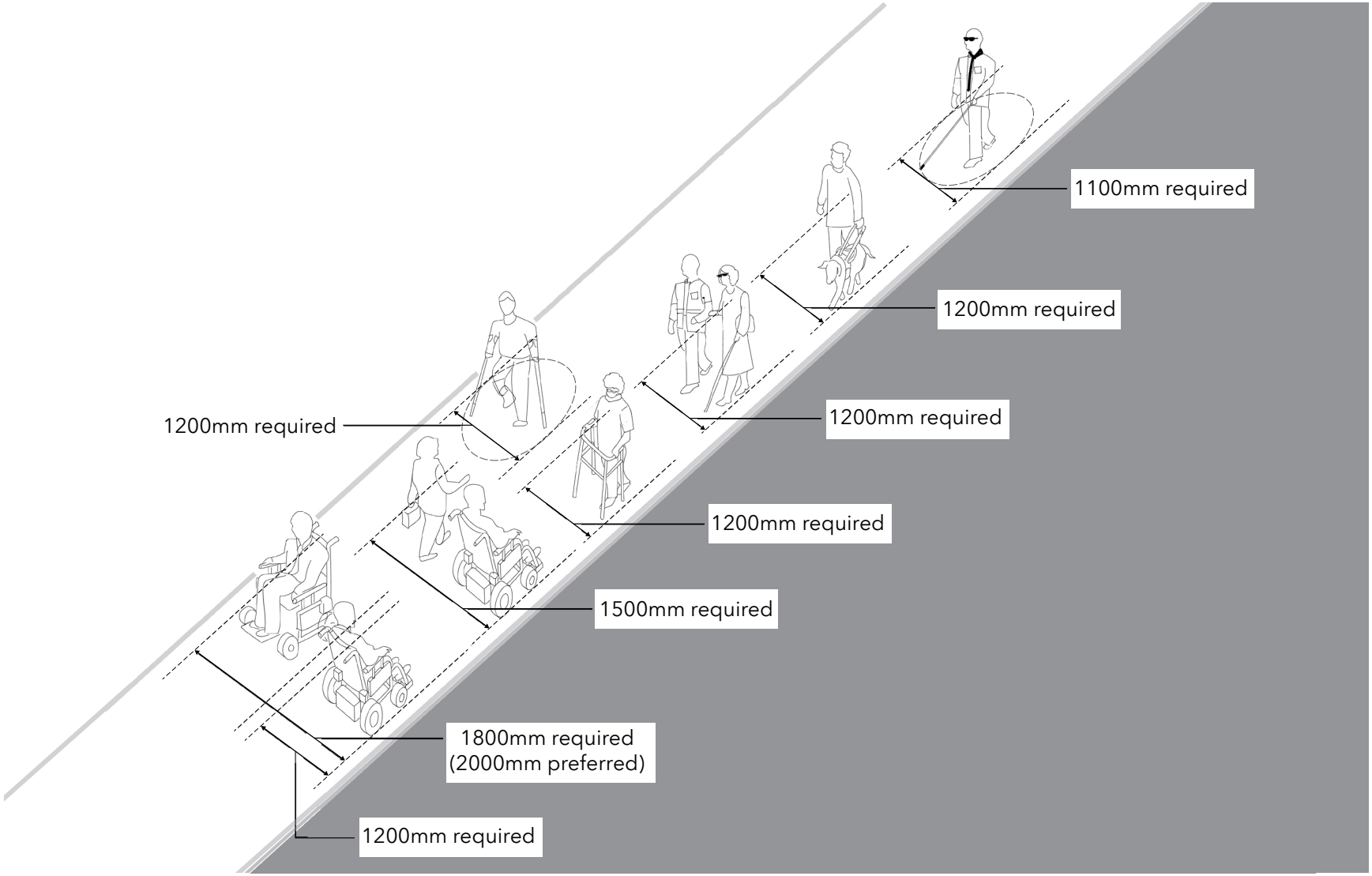

Figure 4: Minimum Clear Widths for Mobility Aid Users

2 CUSTOMER PARKING

2.1 GENERAL PRINCIPLES

The location of accessible parking is important for minimizing travel distances for customers with disabilities and seniors. Many customers with chronic conditions, and customers using mobility devices, may find it difficult to travel long distances, which is particularly important in outdoor facilities where weather conditions and ground surfaces can make travel both difficult and hazardous.

Access aisles for designated accessible parking are required as these provide a safe place for customers to get into and out of their vehicles, and to access the storage compartment of their vehicle.

2.2 GENERAL REQUIREMENTS

a) The minimum numbers of designated parking spaces shall be in accordance with the ratios in **Table 1**, rounding up to the nearest whole number.

b) Accessible parking shall be adjacent and connected to the accessible route without crossing a driveway aisle entering into an adjacent parking space, or interfering with vehicular routes. (**See Figure 5**).

c) Accessible parking shall be located on highly visible, safe routes.

d) Accessible parking shall be located to minimize travel distances throughout the site. It shall be provided

Table 1: AODA Accessible Parking Space Requirements

Total number of parking spaces	Percentage (%) and number of accessible spaces	Type A (van) (number of min. spaces)	Type B (car) (number of min. spaces)
1-12	1 space	1 space	
13-100	4%	Half of total required (if odd number, remaining space shall be type B)	Half of total required
101-200	1 space +3%	Half of total required (if odd number, remaining space shall be type B)	Half of total required
201-1000	2 spaces +2%	Half of total required (if odd number, remaining space shall be type B)	Half of total required
1001	11 + 1% spaces	Half of total required (if odd number, remaining space shall be type B)	Half of total required

along the shortest accessible pedestrian route to the designated accessible boarding areas and to the accessible facility entrance, but no more than 75m.

e) Where more than one parking facility is provided, accessible parking spaces shall be located and distributed among the parking facilities in a manner that provides substantially equivalent or greater accessibility in terms of distance from designated accessible boarding areas or user convenience (e.g., protection from weather, lighting, security and comparative maintenance).

f) When rail platform and bus platform exist, accessible parking shall be located and distributed among locations that offer greater proximity to the designated accessible boarding areas.

g) Within a parking structure, accessible parking shall be located adjacent to an elevator(s) which provides direct access to the designated accessible boarding areas.

h) At paid parking structures, parking meters, in addition to adhering to **Section 7.3**, they shall be located along the accessible path of travel, in close proximity to accessible parking spaces to allow for easy access to the parking meter.

i) Access aisles shall be at the same level as the parking spaces they serve.

j) Accessible parking shall be clearly marked. The International Symbol of Access (ISA) shall be painted on the surface of the designated accessible parking spaces and additional signage on a post positioned at one end. Signs identifying van parking spaces shall contain the designation "van accessible."

k) Within parking facilities, pedestrian circulation paths shall be clearly marked on the road surfaces to indicate pedestrian priority zone.

2.3 TYPE A PARKING SPACE SIZE

a) Van parking spaces shall be 3400mm minimum in width and 5500mm minimum in length, with access aisles to both the side and rear of the space. (**See Figure 6**).

2.4 TYPE B PARKING SPACE SIZE

a) Car parking spaces shall be 2600mm minimum in width and 5500mm minimum in length, with access aisles to the side and rear of the space. (**See Figure 6**).

2.5 ACCESS AISLE

a) Access aisles shall be provided for accessible car and van parking spaces.

b) An access aisle shall be provided adjacent to all accessible parking spaces and shall be 1500mm minimum in width.

c) Where space constraints exist, access aisles are permitted to be shared by two accessible parking spaces.

d) Access aisles shall adjoin an accessible route, providing a safe route for pedestrians to the entrance / circulation core.

e) Access aisles shall not overlap with vehicular routes.

f) Access aisles shall be marked with cross-hatching and shall extend the full length of the parking space.

g) A curb ramp that complies with **Section 4.6** shall be included for each access aisle (unloading area).

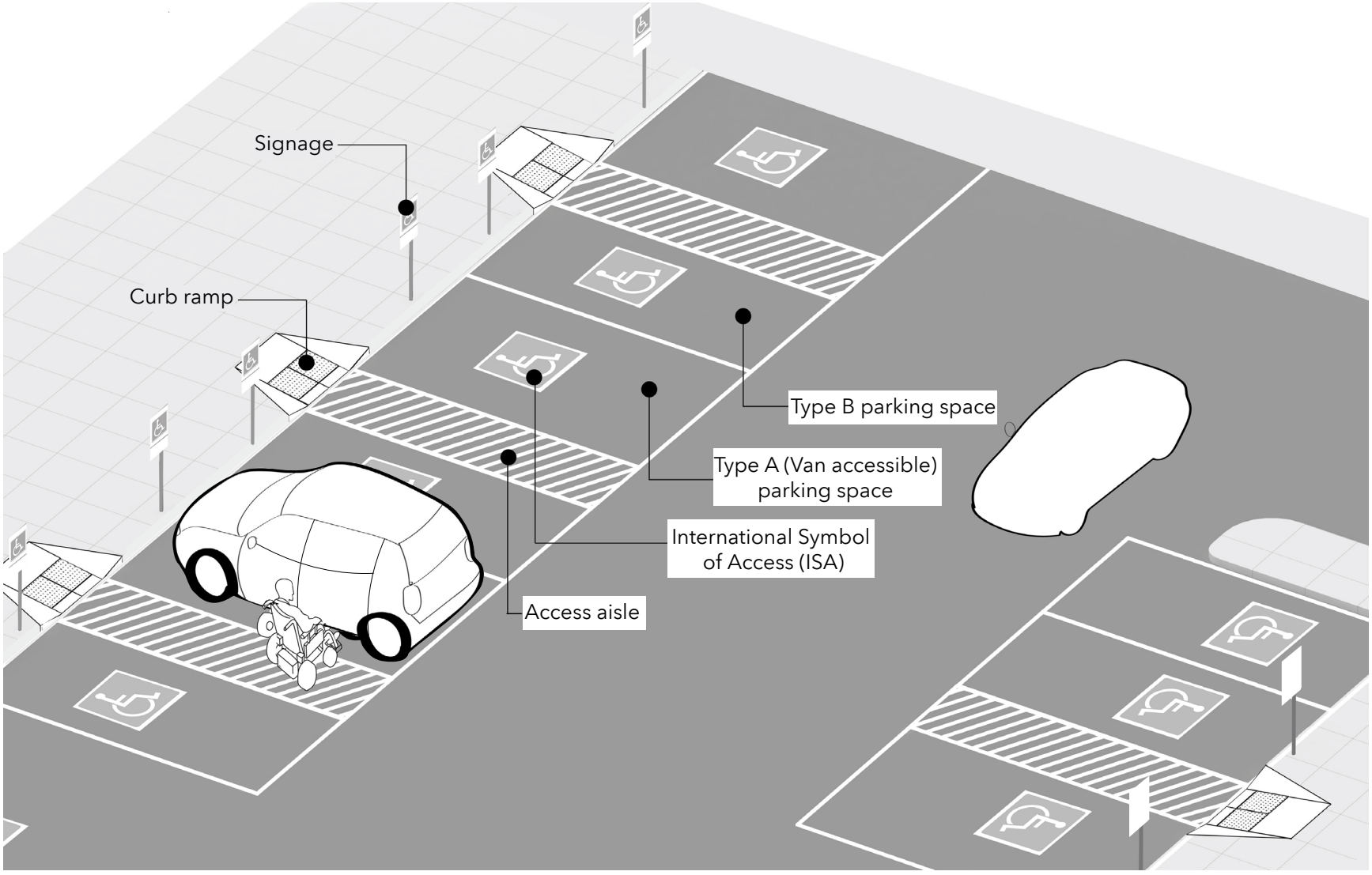

Figure 5: Type A and Type B Accessible Parking Spaces

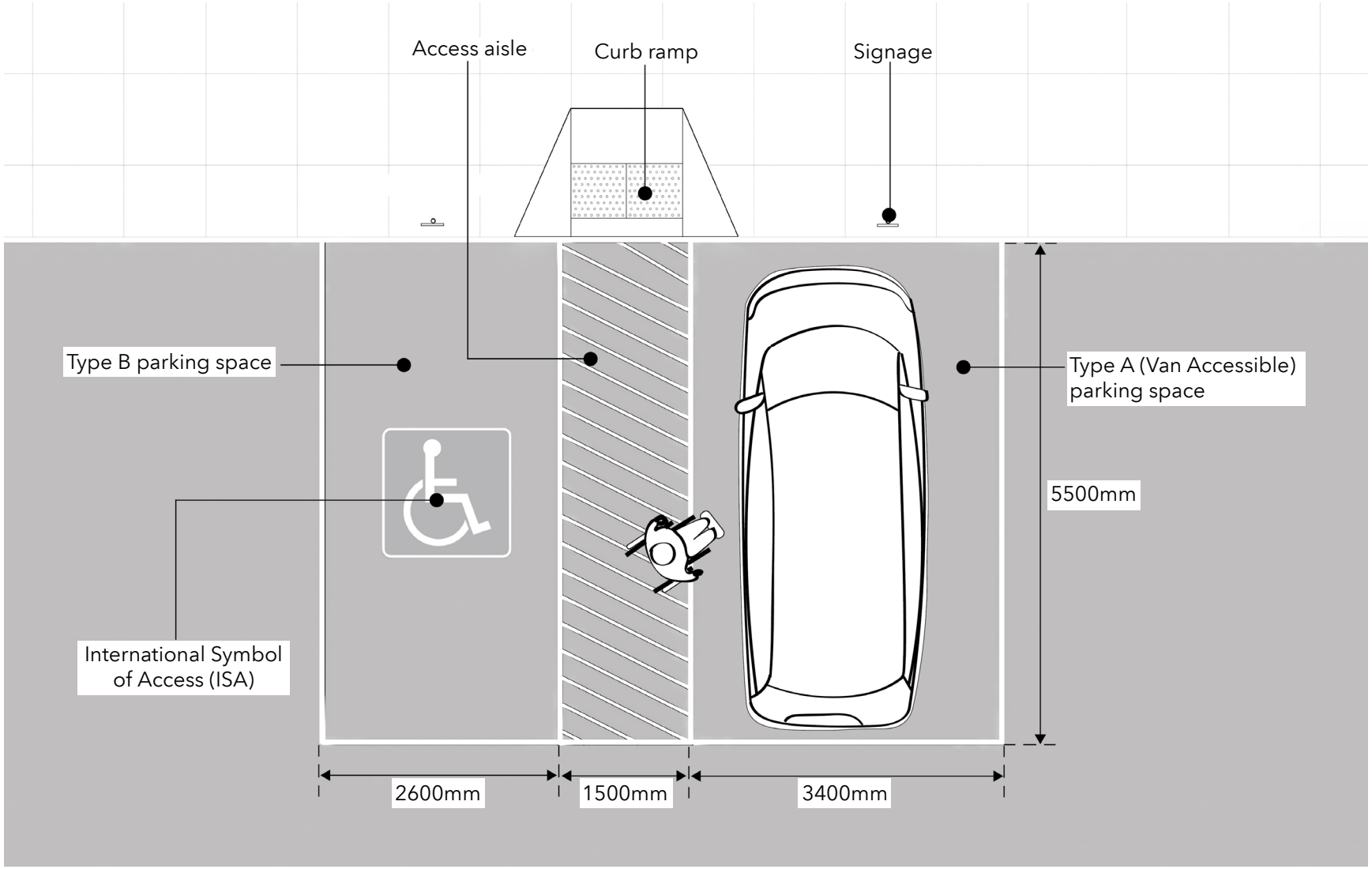

Figure 6: Accessible Parking Configurations

3 BARRIER-FREE ZONE AT PICK-UP AND DROP-OFF (PUDO)

3.1 GENERAL PRINCIPLES

The accessibility provisions at pick-up and drop-off facilities play an important role in facilitating opportunities for customers to gain access to public transit facilities where surrounding infrastructure is not accessible.

3.2 GENERAL REQUIREMENTS

a) The barrier-free zone of the PUDO shall:

1. Be provided on the shortest accessible pedestrian route without exceeding 75m to the designated accessible boarding areas;
2. Be adjacent and connected to the accessible route as defined under **Section 4.2**;
3. Be visible from enclosed passenger waiting areas and maintain clear sight lines from seating areas reserved for customers who use wheelchairs. (**See Section 9.2)**; and,
4. Be designed in accordance with the GO Design Requirements Manual.

3.3 ACCESS AISLE

At the barrier-free zone of the PUDO, a side access aisle shall be provided that:

a) Includes a physical separation between vehicles and pedestrians by means of a raised curb.

b) Include a 3000 mm wide hatched area parallel to the curb to accommodate rear lift-equipped vans as well as side mounted lifts. (**See Figure 7**).

c) Provides a vertical clearance of at least 3600mm at the vehicle pull-up space and along the vehicle access and egress routes to accommodate specialized transit vehicles.

d) Has a minimum length of 12000mm.

e) Provides curb ramp that comply with **Section 4.6** and dedicated loading/unloading area to be located on the right to discharge passengers at the curb or walkway.

f) Is located away from any traffic flow and designed so that users avoid entering any adjacent vehicular routes and drive aisles, designed in a manner that provides visibility to and from other moving vehicles to protect for safe navigation.

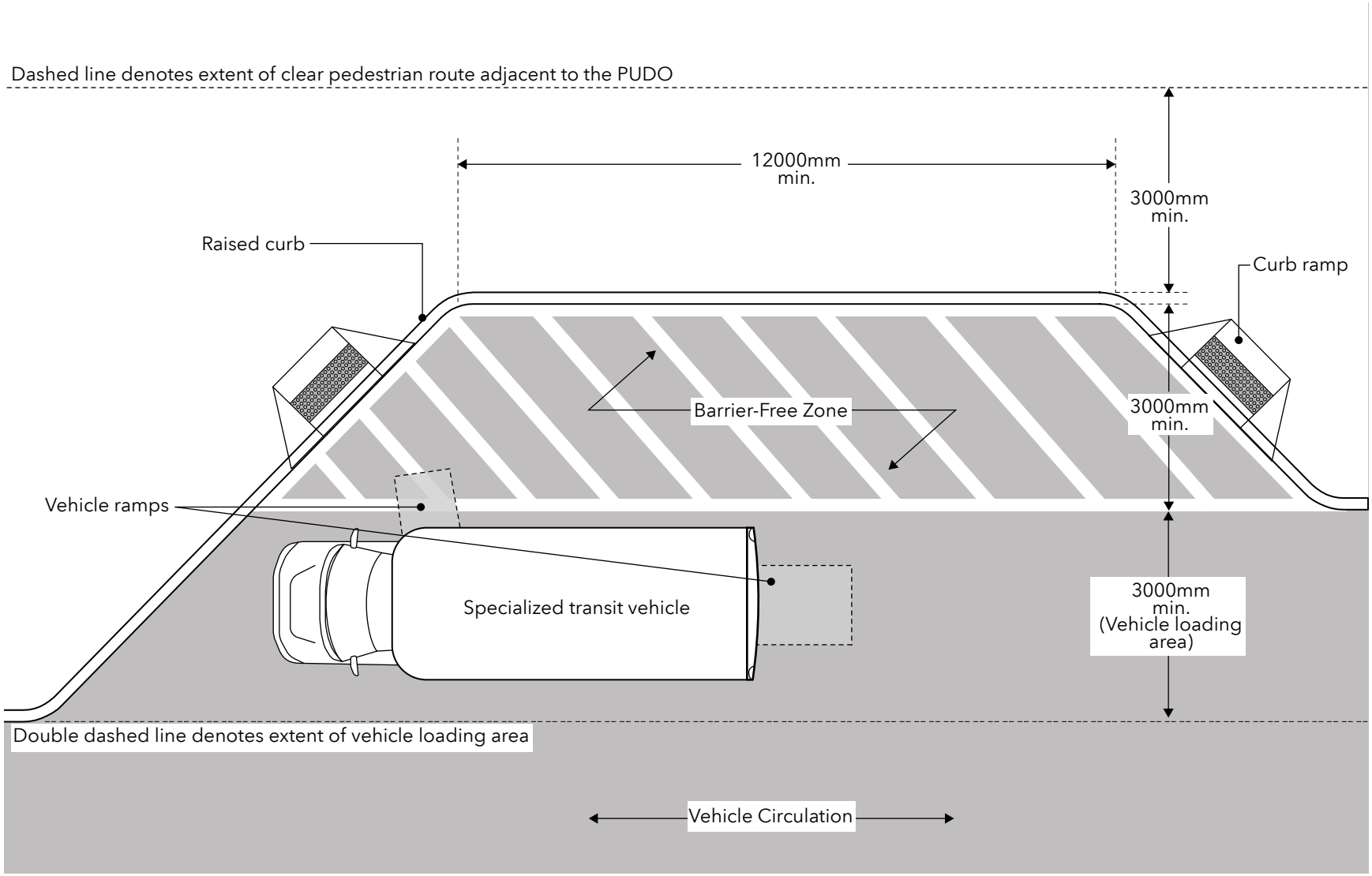

Figure 7: Barrier-free Zone at a Pick-Up and Drop-Off (PUDO)

4 EXTERIOR PATHS OF TRAVEL

4.1 GENERAL PRINCIPLES

Exterior paths of travel shall be located and designed to minimize conflict with vehicular traffic and provide the most convenient, safe and direct access to stations and terminals (including multi-modal access, such as walking and cycling). Supporting amenities such as seating / rest areas, and facilities for service animals, are also necessary for customers using the transit environment.

Exterior paths of travel shall provide clear direct access to and from destinations with open unobstructed paths to the station entrance or platform access points, clear sightlines, and a clear strategy for organizing pedestrian walkways.

Surface finishes are an important element of a built environment and can have a positive or negative impact on navigation through a space. Walking surfaces shall be selected to enable travel through a site that is convenient, even, safe and uniform, for all to use.

4.2 ACCESSIBLE ROUTE

The accessible route is defined as a continuous, unobstructed, step-free, external and internal path of travel connecting accessible elements and services from major arrival areas through to the platform(s).

a) Exterior accessible paths include accessible parking, barrier-free PUDO, pedestrian connections to municipal sidewalk network, crosswalks, and ramps in conformance with **Section 4** and **Section 5**.

b) Interior accessible paths include accessible entrances, power-assisted doors, corridor, and elevators, in conformance with **Section 5** and **Section 6**.

4.3 WALKWAYS AND PEDESTRIAN ROUTES

a) Walkways and pedestrian routes shall provide continuous connections throughout the site and from the municipal sidewalk network to the platforms.

b) Walkways and pedestrian routes should be separated from vehicular traffic, whenever possible.

c) Walking surfaces shall be firm, level and shall not compress significantly and resists deformation by indentation when a person walks or wheels across it to provide a smooth walking surface that is suitable for all.

d) Walking surfaces along the accessible route shall have a maximum cross slope of 2%. In addition, exterior level areas that form part of the accessible route (i.e. landings, rest areas, etc) shall have a maximum running slope of 2%.

e) Adjacent surfaces shall be flush with similar coefficient of friction to reduce risk of tripping or slipping.

f) Catch basin grates and any other surface openings shall be located outside of the accessible path of travel

and shall meet requirements under the GO Design Requirements Manual.

g) Changes in vertical rise along the walkway and pedestrian route shall not exceed 5mm in height. Any variations shall:

   1. Have a 1:2 bevel at changes in level between 6mm and 13mm;
   2. Have a maximum running slope of 1:8 or a curb ramp that meets the requirement of **Section 4.6** at changes in level of greater than 13mm and less than 75mm;
   3. Have a maximum running slope of 1:10 or a curb ramp that meets the requirement of **Section 4.6** at changes in level of 75mm or greater and 200mm or less; and,
   4. Have a ramp that meets the requirements of **Section 5.3** and **Section 5.4** at changes in level of greater than 201mm.

h) Primary pedestrian circulation routes shall provide the space for two persons using a mobility device to pass one another at any point along the path of travel and shall comply with the minimum width requirements in **Section 1.6**.

i) Where a reduction of a pedestrian circulation route is necessary due to existing constraints a pedestrian circulation route shall comply with **Section 1.6**.

j) Any protrusions shall be located within the detection range of a long white cane or be protected by cane-detectable barriers and comply with **Section 1.5**.

k) When a pedestrian circulation route is immediately adjacent to a vertical drop, edge protection and/or a guard shall be provided complying with **Section 1.5**.

l) Seating areas shall be provided every 30m along the accessible route and shall comply with **Section 9.2**.

m) CPTED principles shall be incorporated into the design and layout of walkways and pedestrian circulation routes.

4.4 HAZARDS AND STREET FURNITURE

a) Potential hazards, such as posts, and free standing signage shall be located outside of pedestrian circulation routes in conformance with **Section 1.5**.

b) Bollards and other barriers along pedestrian circulation routes shall have a 50mm contrasting reflective band (or approved equivalent) around the circumference of the bollard at a designated recessed space, 80mm below top surface, and meet the requirements outlined in **Section 12.2**. Bollards shall meet the requirements under the GO Design Requirements Manual.

c) Where access is intended between the bollards, they shall provide a clear width of at least 1200mm to allow the passage of wheeled mobility aids.

d) Any protrusions shall be located within the detection range of a long white cane or be protected by cane-detectable barriers and comply with **Section 1.5**.

e) Objects with a height lower than 1000mm can create a hazard for persons who are blind or who have low vision. Permanent furniture and equipment that cannot be located outside the main accessible path of travel shall include contrasting reflective bands as per **Section 12.2** and tactile attention indicator or cane-detectable guardrails to indicate the location of the hazards.

f) Public realm seating / rest areas shall not obstruct any part of an accessible route and shall be designed to **Section 9.2**.

g) Any road surface information (including markings, tactile routes, etc.) shall consider visibility / accessibility in snow. Where snow obscures information, an alternative means of communicating the information should be provided (e.g. duplication of information at a higher level, etc.).

4.5 BIKEWAYS

a) Bikeways shall be designed and constructed in accordance with the Metrolinx DS-07 Bike Infrastructure Standard.

b) When bikeways run parallel and adjacent to pedestrian routes a separation strip made of any cane-detectable, visually contrasting surface shall be used to indicate priority zones for the various users.

c) When pedestrian pathways and bikeways intersect and a high level of pedestrian cross-traffic is anticipated, pedestrian access shall be clearly identified with signage and tactile surfaces, including tactile attention indicator delineating the line between the pedestrian path and the bikeway. In addition, the bikeway shall provide clear direction to cyclists when/where they are expected to yield to pedestrians.

4.6 CURB RAMPS

a) Curb ramps shall be provided in curbs at pedestrian crossings, at barrier-free parking spaces, at barrier-free PUDOs and wherever there is a change in level not more than 200mm along a barrier-free path of travel (**See Figure 8**).

b) Curb ramps shall be located so that they are free of accumulated rainwater or melting snow, and contain no manhole covers, storm gratings or other openings or obstacles that limit free movement.

c) The running slope of the curb ramp shall be between a ratio of 1:15 (6.66%) and 1:12 (8.33%).

d) The flared sides of a curbs ramp shall be no steeper than 1:10 (10%) and shall be slip resistant.

e) Curb ramps shall have a minimum width of 1600mm,

exclusive of flared sides. Note that this is a minimum width, and that curb ramps shall be designed to reflect the pedestrian flow.

f) Landings shall be provided at the top of curb ramps. The clear length of the landing shall be 1600mm minimum. The clear width of the landing shall be at least as wide as the curb ramp, excluding flared sides.

g) Curb ramps shall not be continuous around corners (depressed curb).

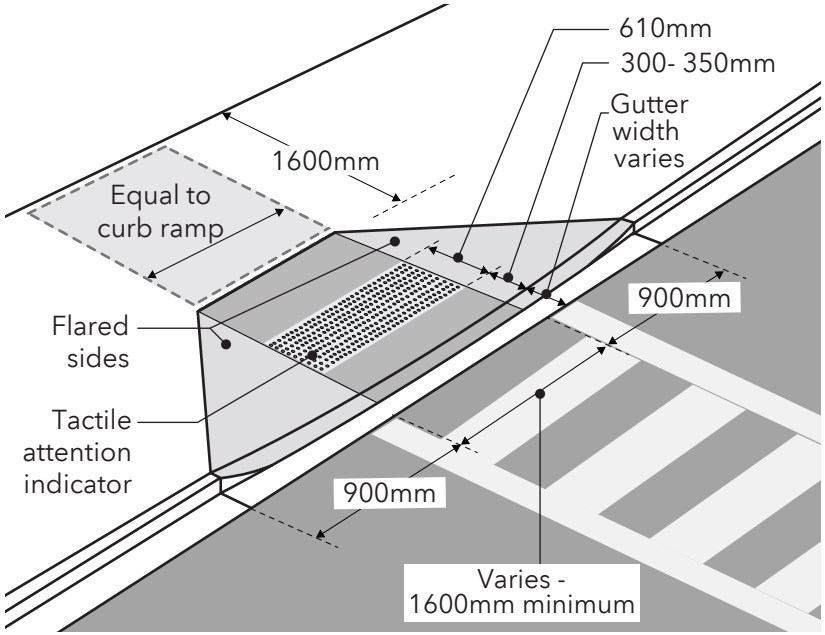

Figure 8: Curb Ramp Design

h) Curb ramps along an exterior path of travel shall align with the direction of travel.

i) Curb ramps shall have Tactile Attention Indicators that:

1. Are located towards the bottom of the curb ramp;
2. Are set back between 300-350mm from the closest edge of the curb;
3. Extend the full width of the curb ramp;
4. Are 610mm in depth as per **Section 8.3**;
5. Are perpendicular to pedestrian route of travel, and
6. Comply with ISO 23599 "Assistive Products for Blind and Vision-Impaired Persons – Tactile Walking Surface Indicators.

4.7 PEDESTRIAN CROSSINGS

a) Pedestrian crossings shall be located and designed to reduce conflicts with vehicles and other modes of transportations and provide the most convenient, safe and direct access to stations and terminals.

b) Pedestrian crossings shall be designed to maintain adequate sight lines between pedestrians and vehicular traffic, and shall be free of obstacles, such as traffic signal supports, posts or catch basins as well as temporary objects such as landscape and streetscape elements.

c) Pedestrian crossings shall include curb ramps in accordance with **Section 4.6** at each end of the pedestrian route where pedestrians are expected to cross or access a roadway.

d) Pedestrian crossing components, including curb ramp, tactile attention indicator and pavement markings shall be located to limit exposure to vehicular traffic by following a line that is perpendicular to the vehicular route being crossed and leads pedestrians directly into the crossing area designated for pedestrian use.

e) Delineated crosswalks shall be installed in conjunction with signs which indicate to drivers that pedestrians must always be yielded the right of way.

f) Passive traffic calming measures shall be included in the design of vehicular access roads that intersect with pedestrian crossings to encourage vehicle speed reduction.

g) Design of pedestrian crossings shall prioritize safe movement of pedestrians, and facilitate visibility and predictability for all users (**See Figure 9**). The goal is to create an environment in which complex movements feel safe, easy, and intuitive by:

1. Removing visual clutter within the streetscape and increasing sightlines for drivers, cyclists, and pedestrians by setting back fixed objects, such as trees, garden beds, traffic signs, light posts and street furniture;
2. Facilitating eye contact between all road users and creating a streetscape in which pedestrians, drivers, and cyclists are aware of one another and can effectively share the road;
3. Keeping pedestrians fully outside all motor vehicle and cycling lanes of the parallel roadway;
4. Locating paths strategically along the most direct route possible anticipating pedestrian desire lines;
5. Including signs, crosswalk markings and passive speed reduction strategies, to prioritize pedestrian safety and identify where vehicles should stop when the pedestrian crossing is being used; and,
6. Each location is site specific and consultation with Municipalities may be required to determine additional measures that respond to site specific challenges or unique conditions.

h) Crossings shall be no longer than 13m in length, with a width of no less than 2100mm (or 2500mm if cyclists are also expected to use the crossing).

i) Where longer crossings are unavoidable, islands shall be included to provide a safe place for customers to stop before completing a crossing.

j) Where islands are provided, the line of travel through a traffic island shall be a straight and aligned pathway from the original crossing point and shall include accessible features, such as a tactile attention indicator installed at each side of the island and curb ramps.

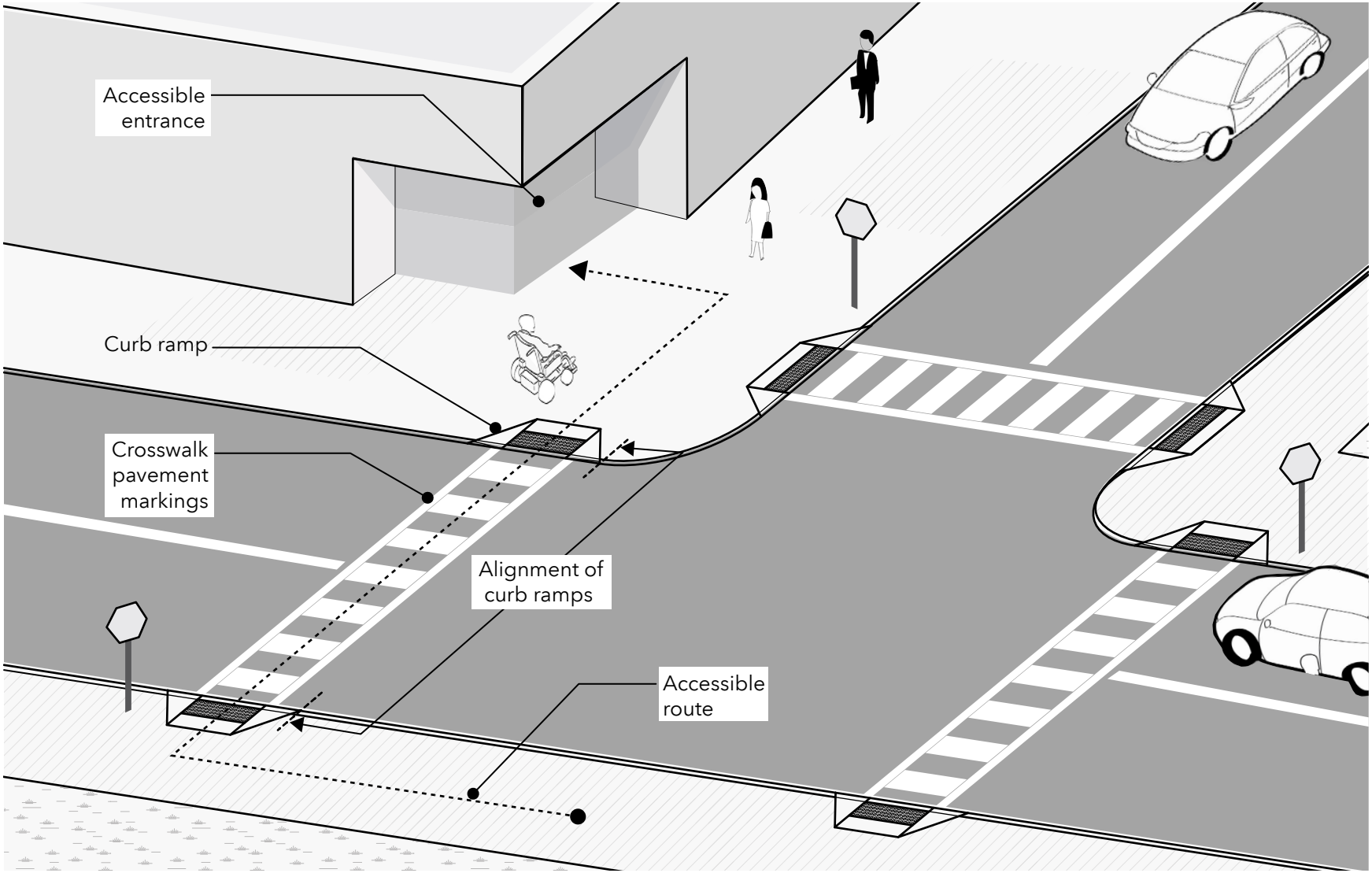

Figure 9: Alignment of Pedestrian Crossing Components

k) Where required, accessible pedestrian signals (APS) shall be designed in accordance with the '' Guidelines for Understanding, Use and Implementation of Accessible Pedestrian Signals and Municipal Standards.

4.8 AT GRADE PEDESTRIAN CROSSINGS

a) At grade pedestrian crossings are not considered part of the barrier-free means of access to platforms. Where at grade rail pedestrian crossings is required, it shall adhere to Transport Canada rules: , Grade Crossing Regulations, Grade Crossing Standards, and Grade Crossing Handbook and Metrolinx Grade Crossing Standard and the GO Design Requirements Manual and:

1. Have a tactile attention indicator, complying with **Section 8.3**, spanning the width of the pedestrian crossings and located so that the edge nearest the rail crossing is at least 5m and at 90 degrees from the nearest rail;
2. When tracks are located in a street that incorporates a pedestrian path, the tactile surfaces at the curb ramp shall eliminate the need for a second set of tactile attention indicator at the rail crossing; and,
3. Tactile attention indicator shall be installed in addition to any mechanical barriers that are activated with the arrival of trains.

4.9 SLOPES

a) Sloped accessible pedestrian routes shall have a running slope no steeper than 1:20 (5%).

b) Where a slope of 1:20 (5%) or less cannot be achieved, it shall be designed as a ramp complying with **Section 5.3**.

c) A sloped accessible pedestrian route shall be provided with level landings complying with **Clause 4.3. d)** for each 500mm rise of the slope. Landings shall be at least 2000mm in length and as wide as the route.

d) Where space permits, the landing of the slope should be increased to have length equivalent to the width of the access route.

e) Landings within a sloped accessible pedestrian route shall provide sufficient drainage to reduce build-up of snow and moisture.

5 VERTICAL CIRCULATION

5.1 GENERAL PRINCIPLES

Where there is a level change, some combination of ramps and elevators shall be provided to allow continuation of accessible routes. Different users have different needs in relation to vertical circulation, and, wherever possible, choice should be afforded for maximum flexibility and provision for different customer needs. Maintaining high visibility for passive surveillance and personal security will be of utmost importance for all circulation routes.

Stairs and escalators shall always be accompanied by a step-free alternative (ramps or elevators), unless otherwise stated within this standard. (**See Figure 10**).

Wherever possible, stepped and step-free options should start and end in the same location, to facilitate legibility and intuitive use, and to avoid segregation of customers. Note that where different circulation elements share landings and run-off spaces, they shall be designed to serve the intended number of occupants. Where vertical circulation is external, the design will require further consideration in relation to increased slip resistance, and sufficient drainage.

5.2 PLATFORM ACCESS

Platform access is defined as a barrier-free route to/from platforms. A minimum of two means of platform access are required to preserve accessibility of services and facilities, when a primary means of access becomes non- accessible due to an out-of-service elevator, construction, or other non-functioning accessible element. Platform access can be provided through elevators, ramps or other means depending upon site conditions.

Platforms Typologies

a) All island platforms and isolated side platforms shall be equipped with a minimum of two separate and distinct means of platform access served by elevators to an underground pedestrian tunnel or an overhead pedestrian bridge.

b) Permeable side platforms shall have a minimum of two means of platform access. Where changes in level exist under 2.5m, weather protected ramps are the preferred means of access/ egress.

Isolated side platforms – Any platform where a permeable edge is not present.

5.3 RAMPS

a) Where an accessible route is steeper than 1:20 (5%), it shall be designed as a ramp.

b) Where there is a change in level greater than 200mm along an accessible route, it shall be designed as a ramp.

c) The maximum vertical height for a ramp shall be 2.5m.

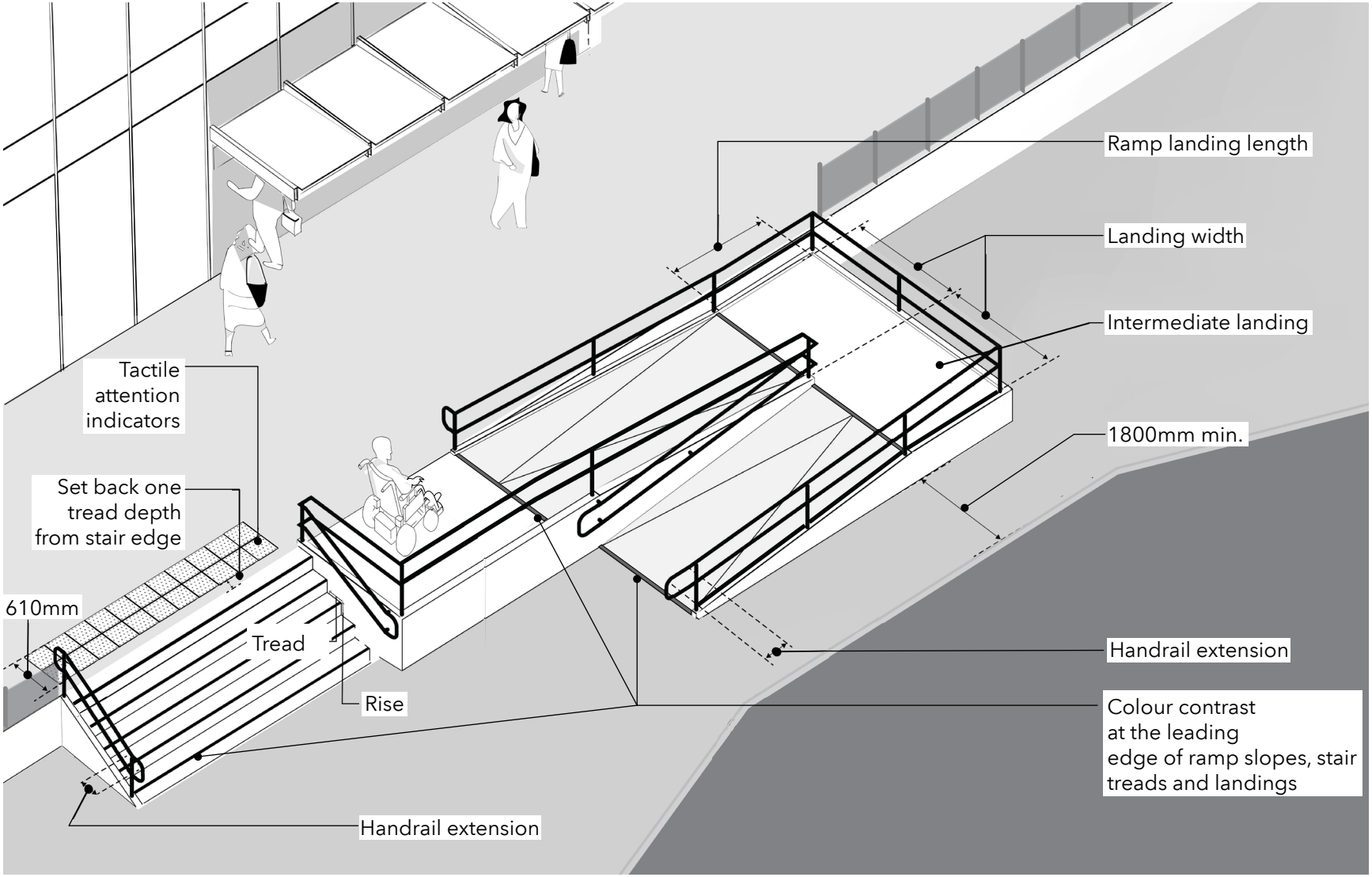

Figure 10: Stair and Ramp Configuration

Where there is a change in level greater than 2.5m along an accessible route, an elevator shall be installed as a means of barrier-free access.

d) Coincidental ramps and stairs (i.e. 'stramp') are not acceptable. A ramp shall not be interrupted by stairs.

e) The clear width of ramps shall be a minimum of 1800mm.

f) Where existing constraints do not permit an 1800mm width to be achieved, a clear width of 1600mm shall be provided, , and direction changes shall be avoided.

g) Level landings shall be at least the width of the ramp, and shall have a minimum length of:

   1. 1670mm at the top and bottom of the ramp;
   2. 1670mm for intermediate in-line landings; and,
   3. 1800mm where passing places are required – e.g., where there is a change of direction at junctions.

h) Edge protection shall be provided on all edges of ramps and landings in the form of a curb with a minimum height of 100mm.

i) Gradients for ramps, excluding the Mini-Platform shall have:

   1. A running slope with the ratio between 1:15 (6.7%) and 1:20 (5%); and,
   2. A distance between level landings not longer than 9000mm.

j) Where ramps are external, adverse weather can cause slippery conditions; based on the infrastructure availability at the location, the pedestrian ramp surface shall include provisions to mitigate snow and ice accumulation, such as sufficient drainage or covered with a dedicated canopy.

5.4 RAMP HANDRAIL DESIGN

a) Handrails shall be provided on both sides of ramps.

b) Handrails shall be continuous and uninterrupted along both sides of a ramp including around landings, except when a door is located on a landing.

c) A continuous intermediate handrail shall be provided between landings for ramps that are wider than 2200mm. Intermediate handrail shall provide a clear width of 900mm between one set of handrails.

d) The top of the handrail shall be provided at a height of between 865-965mm from the ramp surfaces and adjacent walking surfaces and be at a consistent height throughout the ramp.

e) A secondary handrail should be provided at a height of between 500-600mm for use by children and customers of shorter stature. In order to avoid climbability concerns, ramps should be bounded by walls and not be designed with guards. The Mini-Platform is excluded from this requirement.

f) Barriers / balustrade guarding beneath the handrails shall be constructed so that the barrier prevents the passage of a 100mm diameter sphere through the structure (to prevent falling, climbing or injury).

g) Handrails shall:

1. Be provided with a clearance of at least 50mm from the edge of the handrail to the adjacent wall or surface;
2. Handrails shall have circular cross-section and an outside diameter not less than 32mm and not more than 40mm ; and,
3. The gripping surface of the handrail shall be continuous, without interruption by newel posts, other construction elements, or obstructions.

h) Have a bumble bee strip or hazard strip with a distinctive black and yellow visual marker applied to or integrated into the surface of the 300mm handrail extension. The visual marker is intended to notify and assist customers who are blind or who have low vision about the start and end points on the handrail.

i) Handrails, and any wall or other surfaces adjacent to them, shall be continuous, smooth and free of any sharp or abrasive elements.

j) Handrail supports shall be designed to be free of any sharp or abrasive elements.

k) Handrails shall be slip resistant and shall not rotate within their fittings.

l) Handrails for ramps shall extend horizontally at the top and bottom by 300mm beyond and shall return to the wall, down to grade, or back to the guard rail. This provides an opportunity for customers to steady themselves at the start and end of their journey and indicates to customers who are blind and have low vision that they have reached a new level. These shall not obstruct access or egress routes on plan.

5.5 STAIRS

a) Stairs shall adhere to the GO Design Requirements Manual and DS-04 GO Station Architecture Design Standard.

b) Stairs shall be designed in accordance with passenger flow modeling to accommodate the expected flow of customers.

c) Risers and treads shall:

1. Have uniform riser heights and tread depths;
2. Risers heights shall be between 125-180mm;
3. Risers shall be closed;
4. Risers shall not be less than three in a stair;
5. Have treads that are slip resistant;

6. Tread depths shall be between 280-355mm, where depth 300mm is preferred; and,
7. Have a horizontal strip at the edge of the tread that is:
   i) 50 ± 10mm deep;
   ii) is colour / tonal contrasted with the tread and riser; and,
   iii) extends the full width of the tread.

d) Maximum height between landings shall be no more than 3650mm.

e) Nosings shall:

1. Not project more than 38mm, and when projecting they shall be sloped to the riser at an angle of less than 60 degrees;
2. Avoid projections wherever possible;
3. Be of a non-slip material; and,
4. Have a horizontal strip 50 ± 10mm deep that:
   i) is colour-contrasted with the tread and riser; and,
   ii) extends the full width of the tread.

f) Tactile Attention Indicators shall be provided at the top of stairs, for the full width of stairs and for a depth of 610mm, shall be set back one tread depth from the top of the stair and shall meet the requirements under **Section 8.3**.

g) Surge space at top and bottom of stairs shall be at least equal to the width of the stairs to account for safe flow of customers and shall not be used as waiting area for an elevator (**See Figure 12**).

5.6 STAIR HANDRAIL DESIGN

a) Handrails shall be provided on both sides of stairs.

b) Handrails shall be continuous along stair flights and shall be continuous around half landings without interruption.

c) An intermediate handrail shall be provided as per the Ontario Building Code between landings for stairs that are wider than 2200mm.

d) The top of the handrail shall be provided at a height of between 865-965mm from the stair nosings, and walking surfaces, and be at a consistent height throughout the stair.

e) A secondary handrail should be provided at a height of between 500-600mm for use by children and customers of shorter stature. In order to avoid climbability concerns, stairs should be bounded by walls and not be designed with guards.

f) Barriers / balustrade guarding beneath the handrails shall be constructed so that the barrier prevents the passage of a 100mm diameter sphere through the structure (to prevent falling, climbing or injury).

g) Handrail profile shall be designed as follows:

1. Clearance from the handrail shall be at least 50mm from the adjacent wall or surface; and,
2. Handrails with a circular cross-section shall have an outside diameter of between 32-40mm minimum.

h) The gripping surface of the handrail shall be continuous, without interruption by newel posts, other construction elements, or obstructions.

i) Handrails, and any wall or other surfaces adjacent to them, shall be free of any sharp or abrasive elements. Edges shall be rounded.

j) Handrails shall be slip resistant and shall not rotate within their fittings.

k) Handrails shall extend horizontally at the top of the stairs and each side of the stairs by 300mm beyond and in the same direction of stair flights. This indicates to customers who are blind and have low vision that they have reached a full landing.

l) At the bottom of the stairs and each side of the stairs, handrails shall continue to slope for a distance equal to the depth of one tread and then extend at least 300mm beyond, in the same direction of stair flight.

m) Handrail extensions shall follow the direction of the stair flights and shall be terminated in a manner that will not obstruct pedestrian travel or create a hazard. Extensions shall return to a wall, guard or the ground surface, or shall be continuous to the handrail of an adjacent stair flight.

n) Handrails shall be continuous on the inside turn of stairs, and around half landings on the outer turn.

o) All handrails shall have a bumble bee strip or hazard strip with a distinctive black and yellow visual marker applied to or integrated into the surface of the 300mm handrail extension. The visual marker is intended to notify and assist customers who have low vision the start and end points on the handrail.

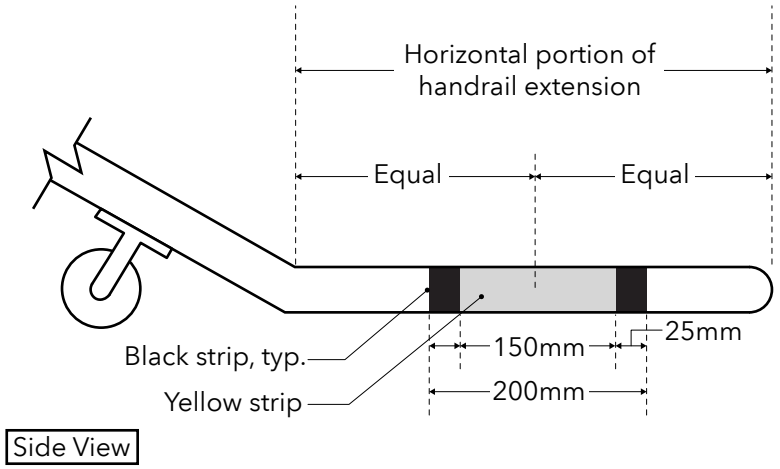

Figure 11: Bumble Bee Strip

p) Handrail tactile signage shall:

1. Be included for all stairs leading to platforms from pedestrian tunnel, bridge, or concourse level (**See Figure 11**);
2. Be provided on the handrail extensions (top and bottom) of the handrail to the right-side of the stair leading toward platform level;
3. Be on the horizontal extension and permanently fitted or fixed to handrails;
4. Be continuous / uninterrupted;
5. At concourse, tunnel, and/or bridge level, be provided with raised tactile elements that include (**See Figure 11a**):
   i) a forward direction arrow leading toward platform level; and,
   ii) Alphanumeric platform number(s) and associated braille immediately below listed in ascending numerical order for the platform(s) the staircase leads to;
6. At platform level, be provided with raised tactile elements that include (**See Figure 11b**):
   i) a left/right direction arrow that leads toward the platform that correlates to the ascending numerical order,

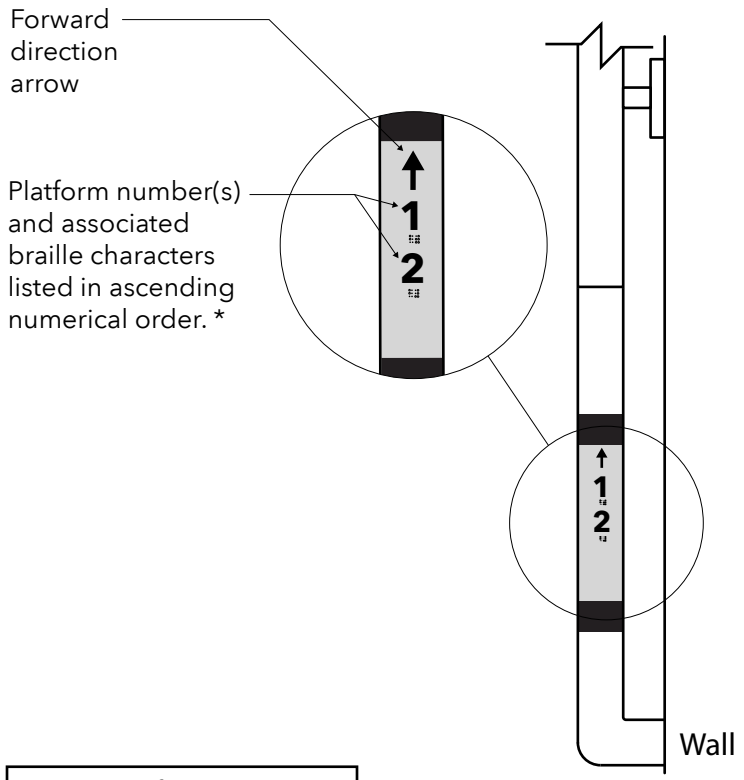

Figure 11a: Concourse, Tunnel, and Bridge Level Tactile Information Configuration

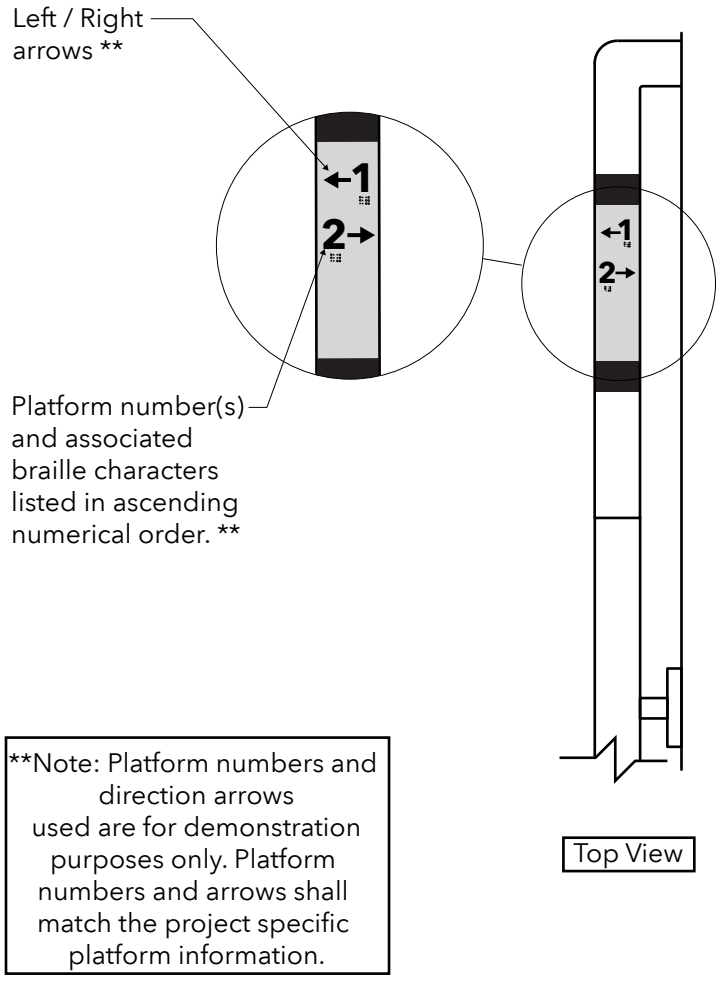

Figure 11b: Platform Level Tactile Information Configuration

ii) Alphanumeric platform number and associated braille immediately below listed in ascending numerical order; and,

7. Meet requirements under **Section 8.4**.

5.7 ELEVATORS

a) All levels accessible to customers shall be accessible with ramps, where the change in level is less than 2.5m or elevators when grade change exceeds 2.5 m. When designing vertical circulation, functionality for universal accessibility shall be considered.

b) In addition to adhering to the Metrolinx Standards, elevators shall comply with Appendix E of ASME A17.1/CSA B44.

c) At platforms, elevator access shall be parallel to the platform edge and consistently located across all stations on the corridor.

d) Elevators shall provide flow-through configuration. "Flow-thru" operation is multi-directional; flow can be in either direction. Enter on one side of hoistway and exit on the other side of hoistway allowing for forward movement of passengers.

e) Surge space leading to the elevator (from the door of the elevator) shall (**See Figure 12**):

1. Be a minimum of 3000mm;

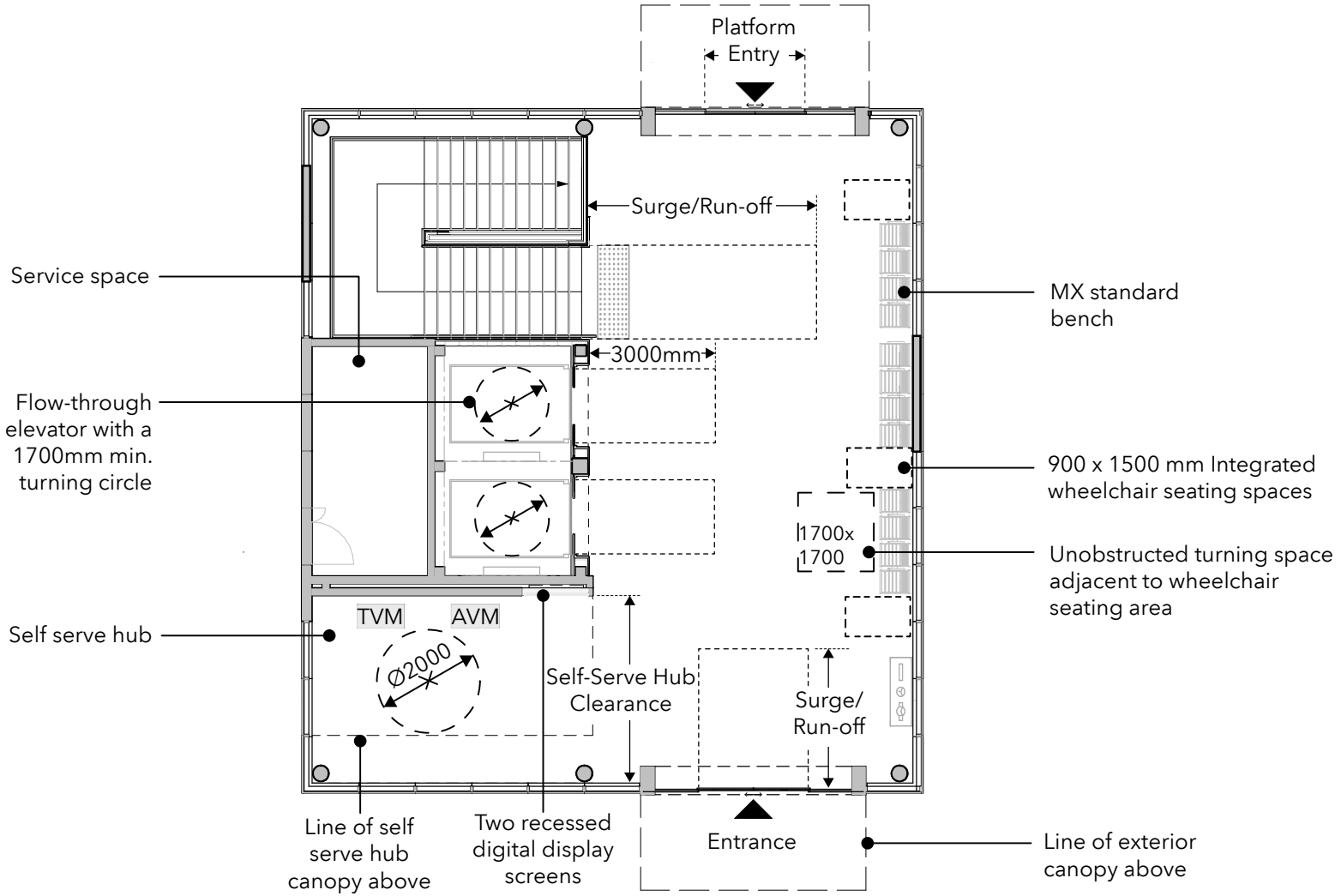

Figure 12: Elevator and Stair Configuration

2. Be designed in accordance with passenger flow modeling;
3. Be clear of obstructions, such as waste and recycle receptacles; and,
4. Away from the path of travel.

f) The internal elevator car dimensions shall be designed in accordance with platform capacity and passenger flow analysis in conformance with DS-12 Pedestrian Flow Modelling Design Standard, and shall provide a minimum clear width of 1700mm to allow two wheelchair users to travel side-by-side.

g) Where an existing physical layout or site constraint make it technically infeasible to provide a flow-through elevator, a non-flow through elevator is permitted. The non flow-through elevator shall:

1. Have clear turning diameter of at least 1700mm;
2. Provide convex mirrors or a mirror on the back wall to support backing out; and,
3. Be programmed so that elevator doors remain fully open for at least 8 seconds.

h) For existing platform conditions, passenger elevators shall be sized in compliance to Appendix E of ASME A17.1/CSA B44 for clear turning diameter minimums and provide adequate access for a patient stretcher in the prone position as per the Ontario Building Code.

i) Elevator controls (within the car and on the landings) shall:

1. Have a clear floor space of 1525mm by 1525mm in front of elevator control panel;
2. Be located within a height of 850-1000mm from the floor to the centre of the control panel, and should be at least 1000mm from any inside corners and return walls;
3. Be centered on the longest side wall inside the car; and,
4. Provided in a consistent location in all Metrolinx facilities, so that it can be easily identified.

j) Elevator directories shall comply with **Section 8.4** and DS-03 Metrolinx Wayfinding Design Standard.

k) Signage shall be included immediately adjacent to the elevator door to indicate an alternate accessible route if the elevator is out of service.

5.8 ESCALATORS

Escalators shall not be considered as part of the barrier-free accessible route and they are not an acceptable means of barrier-free access to platforms. Escalators require the coordination of visual and physical movement, which can be problematic for persons who use a mobility device, for those are blind or have low vision, or for those with cognitive disabilities.

a) Where required as per the passenger flow modeling within station or terminal building, escalator shall conform to ASME A17.1/ CSA B44.

6 INTERIOR HORIZONTAL CIRCULATION

6.1 GENERAL PRINCIPLES

Horizontal movement across the station, or terminal, from entry to exit and accounting for surge space, is essential to the effective movement of customers and to avoid areas of congestion. Interior circulation paths shall establish clear sight lines to key station / terminal building amenities, promote ease of movement for all, with minimal clutter (e.g. unnecessary furniture) and barriers (e.g. unnecessary doors and corridors) where possible. Maintaining high visibility for passive surveillance and personal security will be of utmost importance for all circulation routes.

6.2 DOORS

a) For main entrance doors (including vestibule doors):

1. Automatic sliding doors shall be installed at main station building as part of the accessible route to platform access area; and,
2. The clear opening width of entrance doors shall be a minimum of 950mm. A 1500mm clear opening width is preferred to accommodate larger wheelchairs.

b) For power-assisted doors:

1. Where doors swing into a pedestrian route, a cane-detectable guardrail shall be provided to reduce the risk of collision / injury;
2. Doors shall take at least four seconds to open and close fully;
3. Obstruction sensors shall also be provided;
4. Location of controls doors shall:
   - i) Follow right-hand flow principles;
   - ii) Be located on the latch side of the door;
   - iii) Be located on the latch side of the door;
   - iv) Where the door opens towards the user, the controls shall be located not less than 600mm and not more than 1500mm beyond the door swing; and,
   - v) At platform enclosures, be mounted on guardrails.
5. Controls for automatic doors shall consist of a vertical activation bar that extends from at least 200mm above the floor to to 914mm in height and be 152mm in width, that allows the door to be operated by a hand/arm, crutch, cane, or wheelchair footrest.

c) For all doors (along circulation areas):

1. The minimum clear opening width of doors shall be 950mm minimum;
2. The clear opening height of a door shall be 2100mm;
3. Glazed doors in the accessible route shall conform to CPTED and shall not obscure view from either side with signage or advertisement. Signage or advertisement shall not be placed on glazed doors to avoid impact on the legibility of the space, and on wayfinding and navigation;
4. Where doors swing into a pedestrian route, a cane-detectable guardrail shall be provided to reduce the risk of collision / injury;
5. There shall be no advertising decals on glazing within 1800mm above finished floor;
6. Door panels shall have a luminance contrast between 30 to 40 LRV points difference with the frame or adjacent wall;
7. Glazed doors (and screens) shall have distraction patterns that:
   i) Extend the full width of the door placed at two heights between 850-1000mm and 1400-1600mm above floor level;
   ii) Are at least 50mm in height; and,
   iii) Are visually contrasting to the background when viewed from both sides.
8. Where double doors are provided, at least one active leaf shall comply with the clear opening width requirements above; and,
9. Doors shall be automated or, if manual, have an opening force of no greater than 20N.

d) For all door opening hardware:

1. D-shaped handles shall be provided for manual doors, providing a minimum inside length of 150mm;
2. Handles shall be operable using one hand in a closed fist position, without tight grasping, pinching of the fingers, or twisting of the wrist;
3. Door hardware shall be located at a height of 900-1000mm from the floor; and,
4. Where out-swinging doors should be closed to preserve privacy (e.g., on washroom doors), an additional pull handle, mounted horizontally and close to the hinge side of the door, is recommended.

6.3 ACCESSIBLE FARE GATES

a) Main entrance fare lanes shall accommodate at least two (2) accessible fare gates and shall be located along the accessible path of travel.

b) When there is a ticketing booth for personnel on the

end of the fareline, the accessible fare lanes shall be adjacent to it.

c) Where the PED flow analysis requires three (3) or fewer fare gates at secondary entrances, at least one (1) accessible fare gate shall be provided within the fare lane.

d) Accessible fare lanes shall be identified with the International Symbol of Access (ISA).

e) An accessible fare gate shall have a minimum clear width of 950mm when open to allow for the pass-through of customers.

f) Where fare gates consist of swing gates, doors shall open flush and swing open away from the customer and in the direction the customer is traveling.

g) When fare gates are fully glazed, doors shall include distraction patterns or a continuous opaque strip that:

1. Is visually contrasting to the background of the door as per **Section 12.2**;
2. Is at least 50mm high; and,
3. Extends the full width of the door.

h) When an accessible fare lane has one (1) reader, the horizontal centreline of the reader shall be positioned no more than 900mm above the floor. When a second reader is provided, the reader shall be positioned 750mm above the floor.

i) Reader shall provide visual and audible feedback for successful tap for easy identification by all users and readers should indicate which gate they open.

j) When accessible fare lane includes a digital screen, it shall meet requirements of the Metrolinx Accessible Self-Service Kiosk (MASK) Checklist.

6.4 VESTIBULES

a) 1600mm clear space shall be provided between door swings where doors are provided in series, to reduce the risk of wheelchair users getting trapped within the vestibule. The dimensions allow a wheelchair user to gain access through one door and allow it to close behind them, before reaching the second door in the vestibule.

6.5 CORRIDORS

a) Corridors shall comply with **Sections 1.5, 4.2**, and **4.3**.

b) All circulation routes shall be wide enough to allow wheelchair users to manoeuvre, for other wheelchair users to pass and, where necessary, turn through 180°.

c) All corridors shall comply with the clear width requirements outlined in **Section 1.6**.

d) Corridors shall provide a continuous and unobstructed path of travel connecting accessible elements and services and establishing clear sight lines to key building amenities.

e) Clear lines of sight shall be provided to aid navigation and wayfinding.

6.6 TUNNELS

a) All tunnel routes shall adhere to the requirements under the GO Design Requirements Manual and DS-04 GO Station Architectural Design Standard.

b) Any vertical circulation elements shall meet the requirements under **Section 5**.

c) Corners shall be 45 degrees angled and provided a minimum clear path of width of 1300mm free of obstructions, such as waste and recycle receptacles or other vertical structures.

d) Convex mirrors units shall be provided at internal 90° corners and angled wall corners at directional changes.

7 SERVICE COUNTERS AND SELF-SERVICE MACHINES

7.1 GENERAL PRINCIPLES

Service counters (e.g. service counter or information desks) are an important interface between Metrolinx and their customers and shall therefore be easily approached and accessible.

Self-service machines (including fare machines) shall also be accessible and intuitive to use, to allow customers to access services independently and with ease.

7.2 SERVICE COUNTERS

a) Counter surfaces shall include a lowered portion to accommodate seated customers (**See Figure 13**). Service counters shall have:

1. A table or counter surface at a height between 730mm and 860mm from the floor;
2. Knee clearance between the counter and the floor at least 200mm deep and 680mm high;
3. Toe space at least 230mm deep and 230mm high; and,
4. Clear maneuvering space that complies with **Section 1.2**.

b) Where appropriate, a universally accessible counter with a single height between 680mm and 900mm from the floor is preferred as this does not require segregation and means that any counter space will be suitable for all users. Height adjustable counters should also be considered. (**See Figure 13**).

c) Barriers forming queuing areas shall not be fixed to the floor and shall allow a minimum clear width of 1500mm for each line (to provide sufficient width to allow for the passage and maneuvering of customers who use mobility devices, especially where queuing lines change direction).

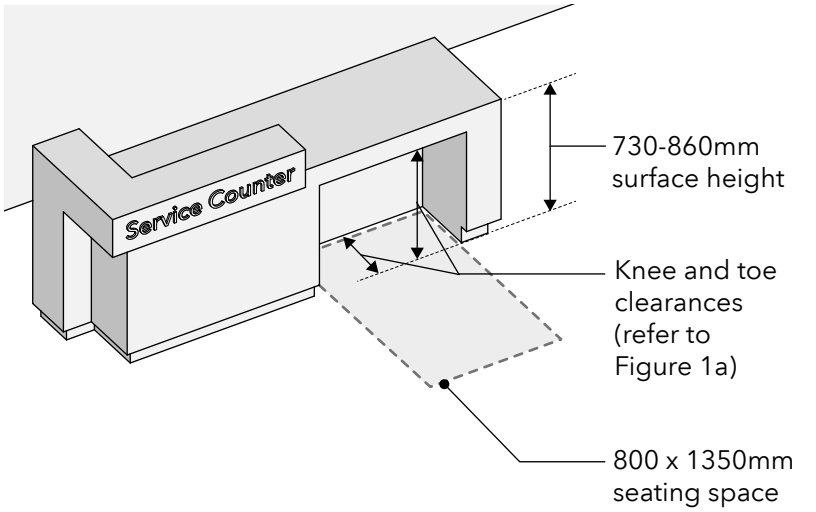

Figure 13: Service Counter Clearances

d) Movable queuing lines shall have a luminance contrast of 30LRV points difference with the surrounding environment. Queuing lines with a lower retractable "belt" should be considered, for easier cane detection.

e) A built-in hearing induction loop intercom system shall be installed at service counters to aid communication for the benefit of hard of hearing customers. Hearing induction loops shall meet the requirements of the IEC 60118-4 Standard. Service counters equipped with hearing induction loops shall be clearly identified with the ISO international T-Coil Symbol.

7.3 SELF-SERVICE MACHINES

Self-service machines means interactive electronic terminal, including point-of-sale devices and fare systems that allow customers to access one or more services.

a) Where reaching is critical for completing a task, a clear turning space of at least 2000mm by 2000mm shall be provided and centered on the target (device).

b) When multiple devices are adjacent to each other, the clear turning space of at least 2000mm by 2000mm can overlap. Devices shall be equally spaced along the length of the wall, with a clearance of at least 1700mm between devices.

c) Self-service machines shall be located at least 1000mm from adjacent inside corners and return walls.

d) Interactive elements of self-service machines (including touch screens and buttons) shall be at an accessible height for forward and side reach, in accordance with **Section 1.3** and **Section 1.4**.

e) Accessible self-service machines shall provide the same degree of privacy of input and output available to all individuals.

f) Metrolinx fare systems and devices shall be placed along the customers' journey to the platforms and comply with placements requirements under the DS-04 GO Station Architectural Standards.

g) Metrolinx self-service machines and fare devices shall comply with the requirements under the Metrolinx Accessible Self-Service Kiosk (MASK) Checklist.

8 ENHANCED WAYFINDING AND PUBLIC COMMUNICATION SYSTEMS

8.1 GENERAL PRINCIPLES

The wayfinding strategy is critical to making sure that everyone can easily navigate their way around the site. This will include intuitive static and digital signage, complemented by enhanced wayfinding and public communication systems (which may include tactile signage, Tactile Walking Surface Indicators, announcements and digital tools) where required.

Signage and information shall be complementary to the environment, providing a simple and consistent method for customers to orient themselves, knowing their destination, following the best route and find their way, and shall be consistent across the Metrolinx network to aid legibility and understanding from customers.

Information should include interchange / connection information wherever possible, coordinating with additional and municipal service providers to deliver consistency in the presentation and content of information provided.

8.2 SIGNAGE

a) Signage shall comply with the guidance provided in the DS-03 Wayfinding Design Standard.

b) Signage shall be provided to identify the accessible route, accessible facilities and services, and main destination points and shall be located where they are clearly visible to customers who are seated, standing or walking.

c) Directional signs shall be placed along the accessible path of travel and decision points to assist with navigation. They shall constitute a logical orientation and consistent sequence from the starting point of the customer journey, to; circulation cores, platforms, the accessible boarding location (and to the dedicated accessible area of the vehicle (where allocated).

d) Supportive measures for information and wayfinding shall be provided in a format that is accessible to customers with different abilities:

   1. Audible / tactile information for customers who are blind or who have vision loss; and,

   2. Visual information for customers who are deaf, hard of hearing or deafened.

e) Consideration shall be given to the provision of visual, audio and tactile information for wayfinding and navigation, which should be coordinated to provide consistency in language across the network,

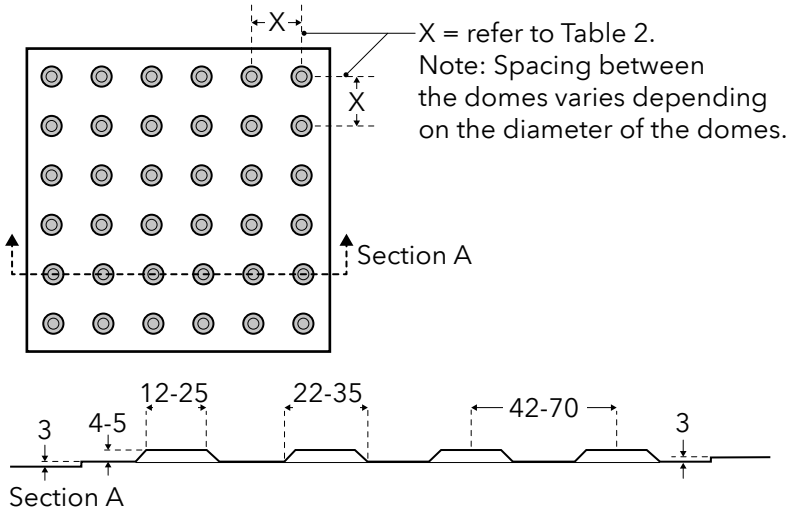

Figure 14a: Tactile Attention Indicators

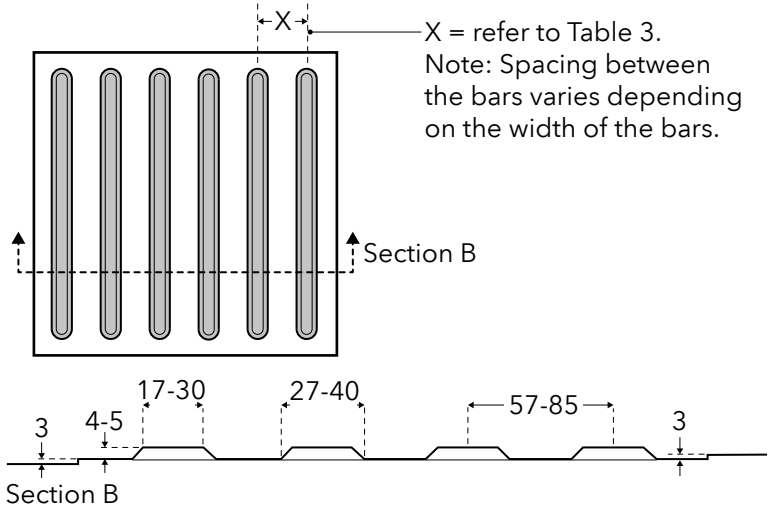

Figure 14b: Tactile Direction Indicators

for surrounding infrastructure and within Metrolinx facilities.

f) To support navigation of customers who have low vision, the main accessible path of travel should provide a visual contrast between the ground and the surroundings. (**See Section 12.2)**.

8.3 TACTILE WALKING SURFACE INDICATORS (TWSI)

There are two different TWSI types to be used within transit infrastructure:

a) Attention indicator (truncated domes) signals a need for caution at a change in elevation, a vehicular route, train platforms, etc. (**See Figure 14a**).

b) Directional indicator (elongated flat top bar surface) facilitates wayfinding in open areas and indicates a possible route that may be taken. (**See Figure 14b**).

c) Attention indicator:

1. An Attention indicator shall consist of truncated domes and shall have the following characteristics:

   i) Be arranged in a square grid;

   ii) Height of truncated domes shall be 4-5mm;

iii) Top diameter of the domes shall range between 12-25mm;

iv) Bottom diameter of the dome shall be 10 (+/-1) mm greater than the top diameter; and,

v) Spacing between the domes (shortest distance between the centres of two adjacent domes, i.e.: 'x') shall comply with **Table 2**.

2. A minimum of 70LRV points tonal contrast between the TWSI and the surrounding floor surface shall be provided, unless the TWSI is safety yellow, in which case at least 50LRV points tonal contrast is permitted.

3. Shall be made of materials that are durable and slip-resistant;

4. Shall have any smooth adjacent walking surface for at least 600mm wide;

5. Shall be included across the entire width of the hazard with a depth of 610mm and shall have one side against the edge of the hazard, unless otherwise indicated in this Standard; and,

6. A tactile attention indicator surface shall be located:

   i) At the top of stairs, to comply with **Section 5.5**;

   ii) At platforms as per **Section 11.2**, and shall conform to Concrete Platform Curbs and Mini-Platform GO Standard Drawings and Specifications;

   iii) At curb ramps, to comply with **Section 4.6**;

   iv) At grade rail pedestrian crossings to comply with **Section 4.8**; and,

   v) At an entry into a vehicular route or area where no curbs or other elements separate the vehicular route from a pedestrian route.

d) Tactile Direction Indicators (applicable to Rapid Transit only):

   1. Tactile direction indicators shall consist of four (4) parallel flat- topped elongated bars.

   2. Bars in tactile direction indicator shall:

      i) Be 4-5mm in height;

Table 2: Tactile Attention Indicators – Spacing Between Domes

Top diameter of truncated domes (mm)	X Spacing (mm)
12	42-61
15	45-63
18	48-65
20	50-68
25	55-70

Note: Systematic research has shown that a top diameter of 12 mm is optimal for detection and discrimination underfoot.

ii) Have a top width shall range between 17-30mm and a base width range 10mm ± 1mm greater than the top width;

iii) Have a top length more than 270 mm and the base length shall be 10 ± 1 mm longer than the top length; and,

iv) Centre-to-centre spacing , i.e. 'x', in compliance with **Table 3**.

3. Tactile direction indicators shall be 300mm wide configured as a single unit (integrated unit) (Exception: tactile direction indicators on bus platforms leading to bus boarding points and Designated Waiting Areas (DWA) of the rail platforms shall be at least 600mm wide);

4. Tactile direction indicators shall have a minimum of 50 LRV points tonal contrast from the surrounding floor surface;

Table 3: Tactile Guiding Indicators – Spacing Between Bars

Top width of flat-topped elongated bars (mm)	X Spacing (mm)
18	57-78
20	60-80
25	65-83
30	70-85

Note: Systematic research has shown that flat-topped elongated bars with a top width of 17 mm are optimal for detection and discrimination underfoot.

5. Tactile direction indicators shall not be yellow;

6. Tactile direction indicators shall be installed with the elongated bars running in the direction of travel;

7. An unobstructed space of at least 600mm wide shall be provided continuously along each side of the tactile direction indicator;

8. At turns and decision-making points along tactile direction indicator routes, the direction tiles shall stop on either side of a 600mm by 600mm level and unobstructed ground or floor area;

9. Tactile direction indicators shall be set back approximately 600mm from the start/end points; and,

10. Any exterior application shall include heat tracing.

8.4 TACTILE SIGNAGE

a) Tactile signage shall:

1. Have a raised surface of at least 1mm;

2. Have a luminance contrast of at least 30LRV points difference between the lettering and the background;

3. Include sans serif font;

4. Provide essential information on direction, facility name and level information (e.g., concourse, platform);

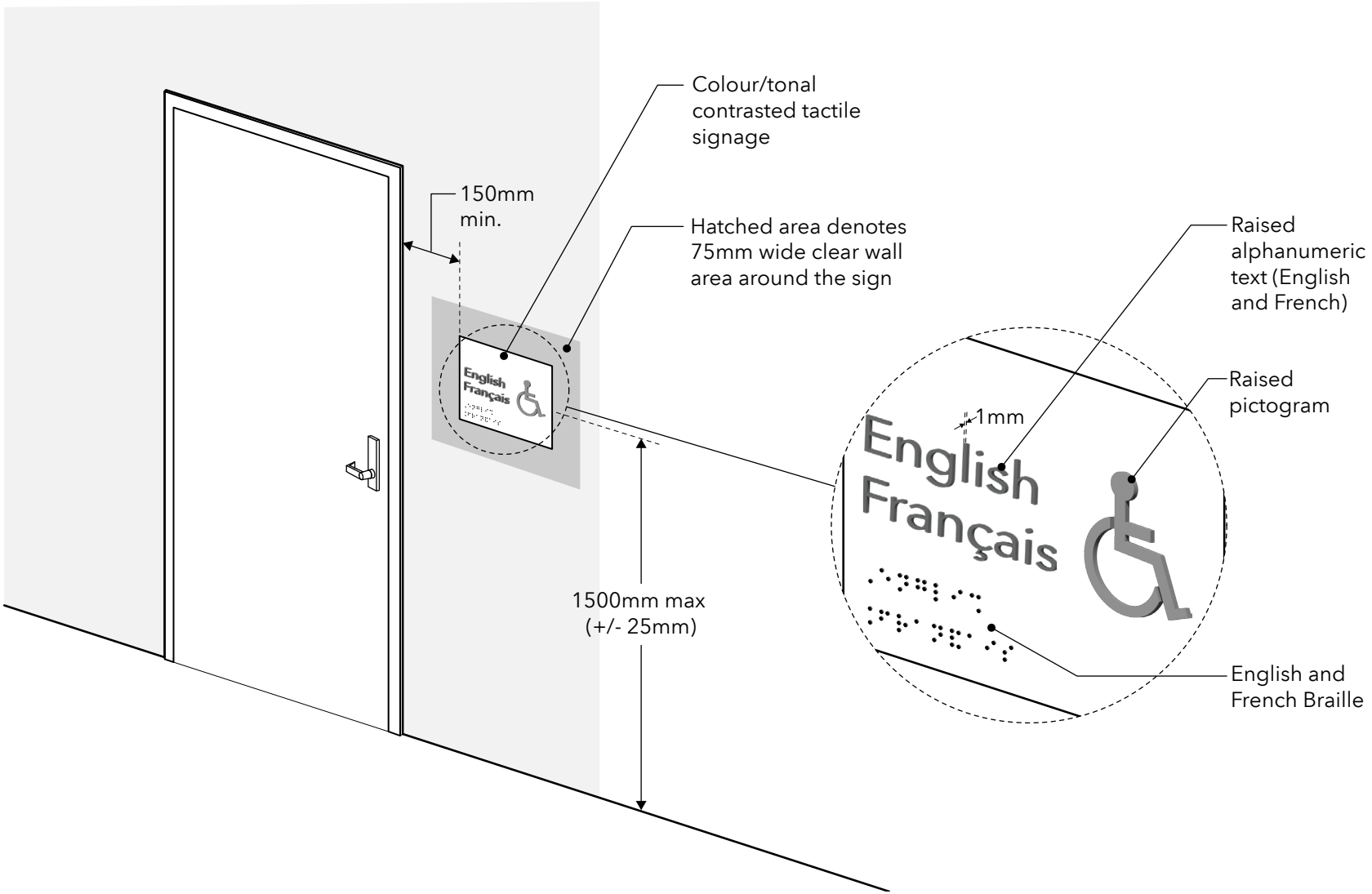

Figure 15: Tactile Signage Mounting Location

5. Use simple, consistent and logical layout; and,
6. Include English followed by French.

b) Positioning of signs:

1. Tactile information shall be positioned with the horizontal centre line 1500mm ± 25mm above ground level, and shall have a clear wall area around the sign of at least 75mm wide (**See Figure 15**);
2. Shall allow a person to approach the sign to within 100mm without encountering protruding objects or standing within a door swing;
3. If used to identify a door, tactile signage shall be mounted on the wall beside the latch edge of the door;
4. Where there is no wall space on the latch side of a single door, or to the right side of double doors, signs shall be on the nearest adjacent wall; and,
5. Where on handrails, this shall be provided at the start (on the horizontal extension), be continuous / uninterrupted and include platform information on the level the stair leads to and comply with requirements under **Section 5.6**.

c) Where braille is provided:

1. Braille shall be un-contracted (Grade 1) and meet the "Accessible Signage Guidelines" by Braille Literacy Canada;
2. Braille shall use Sentence Case to ensure use of capital letters as appropriate;
3. Braille shall be positioned 10mm below the corresponding print and from any other raised characters and raised borders and decorative elements;
4. On signs with multiple lines of text and characters, braille shall be separated from raised characters and shall be placed below the entire text in a separate paragraph so that the comprehension flow is not broken;
5. English and French braille should be displayed one underneath the other one (English first then French). If text is multi-lined, English and French

Table 4: Braille Dimensions Requirements

Measurement range	Minimum and maximum (mm)
Dot base diameter	1.5-1.6
Distance between two dots in the same call	2.3-2.5
Distance between corresponding dots in adjacent cells	6.1-7.6
Dot height	0.6-0.9
Distance between corresponding dots from one cell directly below	10.0-10.2

braille should be displayed in two separate columns;

6. If braille is displayed as a separate paragraph, it can be lowered to 1350mm above ground level, measured to the baseline of the braille cells; and,
7. Braille dimensions shall be in accordance with **Table 4**.

8.5 DIGITAL SIGNAGE

a) Digital signage shall meet the requirements under the GO Design Requirements Manual.

b) Digital signage shall be provided to inform customers of real-time service information (e.g., trip information, service changes, and disruptions).

c) Characters and their background shall have a non-glare finish.

d) Characters shall contrast with their background, with a 70 (LRV) point difference between the sign background and information.

e) The brightness of digital signage in exterior locations should automatically adjust in response to changes in ambient light levels.

f) Where digital signage cannot be displayed in its entirety on a single screen, information shall either be paginated (preferred) or scrolling in the vertical direction.

g) Customers who have low vision might have to approach much closer to read information than customers with average visual acuity. Trip information signage shall be provided along the accessible route to allow persons to get closer to the screen. It shall be mounted at eye level, at a height between 1200mm to1500mm from centreline to the floor. Where interactive features are included in the screens, the interactive elements shall be located between 1100mm to 1500mm.

h) Advertising on digital screens shall not have strobing, flashing, flickering, or other distracting effects.

i) All forms of advertising shall be silent.

8.6 PUBLIC ADDRESS (PA) SYSTEMS

a) Public address (PA) shall comply with the requirements under the GO Design Requirements Manual.

b) PA systems shall be clear and legible, whether they are conveying emergency or general information.

c) Consideration should be given to technologies that can automatically convert speech to text, to allow real-time information for customers who are deaf, hard of hearing or deafened.

d) PA announcements shall be clearly audible (with ambient noise canceling) and supplemented by visual information.

8.7 ASSISTIVE LISTENING SYSTEMS AND TWO-WAY INTERCOMS

a) Two-way intercoms shall comply with the requirements under GO Design Requirements Manual.

b) Two-way intercoms controls shall be identified with raised symbols and Braille in compliance with **Section 8.4**.

c) Two-way intercoms operating instructions, including the availability of alternative emergency communication for persons who are deaf and non-verbal shall be presented in both tactile and visual form in compliance with **Section 8.4**.

d) Hearing induction loop systems shall be mounted at a height such that operable components are located between 900mm to 1100mm from the floor and comply with **Section 1.4** of this Standard in order that it can serve both standing and seated persons.

e) At the Designated Waiting Area (DWA) on the platform, an enhanced two-way intercom shall be provided for the purpose of accommodating customers who are D/deaf, hard of hearing or deafened. Enhanced two-way intercoms shall include the following functionality:

1. Localized induction loop system to support telecoil wireless technologies for the benefit of hard of hearing customers; and,
2. Visual display and input device (keyboard) to support text communication (text input and output) for the benefit of customers who are deaf, hard of hearing and non-verbal.

9 CUSTOMER FACILITIES

9.1 GENERAL PRINCIPLES

Customer facilities need to be provided to foster a positive customer experience, comfort and access. These facilities shall be designed to provide as equitable and integrated experience for all users.

9.2 SEATING AREAS

a) Seating areas shall be provided every 30m along the accessible routes to the platforms. Interval of 25m for waiting areas is preferred, aligned with designated accessible boarding areas, where provided along main pedestrian circulation routes.

b) Along the platform, seating areas shall be sheltered and outside of main circulation paths of travel.

c) Waiting areas shall establish clear sight lines to major arrival areas maintaining clear views from seating areas reserved for customers who use wheelchairs.

d) Within waiting areas, space shall be provided within banks of seating, to allow wheelchair customers to sit alongside other seated users (i.e. so that the back of the wheelchair is aligned with the backs of the seats). A minimum of 3% of the seating shall be accessible, but in no case shall there be less than one accessible seating space.

e) Each wheelchair accessible seating area shall provide a clear floor area of at least 900mm by 1500mm for stationary position with an adjacent clear floor of at least 1700mm by 1700mm for an unobstructed U-turn.

f) Seats at the ends of the row shall allow customers who use wheelchairs to transfer from the wheelchair onto a seat.

g) Seating within waiting areas shall be designed a per GO Standard benches and meet the requirements under DS-04 GO Station Architectural Design Standard.

9.3 RETAIL

a) Where retail spaces are provided, the same principles as outlined throughout this Standard shall apply, including accessible counter heights (**See Section 7.2**) and finishes (**See Section 12**).

b) Access routes alongside retail should be increased to a width of between 3500-4500mm, to allow additional space for customers entering / leaving / queuing and congregating in retail areas.

9.4 GENERAL WASHROOM PROVISIONS

a) Where washrooms are provided, they shall comply to:

1. The Ontario Building Code Section 3.8.; and,
2. Metrolinx Standards. Dimensions found in illustrated graphics are sourced from the Ontario Building Code requirements.

b) Washrooms shall be located on an accessible route.

c) Occupancy washrooms shall be designed to protect the privacy of the individuals using the washroom so that there are no direct sightlines into toilets/urinals and lavatories.

d) Entrances into multiple washrooms (i.e. female/male) shall be door-less.

e) Where doors are provided at a single-use washroom entrance, they shall be equipped with vertical power door operators (**See Section 6.2**).

f) A minimum clear turning diameter of 1700mm shall be provided inside washroom circulation areas, to allow users of mobility aids to make a 360° turn.

g) Washrooms should provide accessible lavatories, and fixtures and furnishings that are easy to reach.

h) Where additional plumbing fixtures are provided beyond the minimum required in the Ontario Building Code as a convenience to customers, additional accessible washrooms shall also be provided to ensure equitable access to washrooms.

i) Any fixtures provided within washrooms or accessible toilet stalls shall not impede required clearances identified in **Sections 9.5, Sections 9.6**, and the Ontario Building Code. This includes a baby change table left in the fold down position, sanitary napkin dispensers, garbage bins, etc.

9.5 ACCESSIBLE TOILET STALLS IN MULTIPLE OCCUPANCY WASHROOMS

a) The door to the accessible toilet stall shall have a clear opening width of at least 900mm.

b) The door to the accessible toilet stall shall open outwards from the outset as this will be easier to navigate for all customers.

c) The door of the accessible toilet stall shall be aligned with the transfer space adjacent to the toilet.

d) All internal dimensions shall be meet those indicated in **Figure 16a** and **Figure 16b**.

e) Where more than one accessible stall is provided, the transfer space shall be located opposite of the toilet to accommodate different transferring needs.

f) The location of the fixtures in relation to the space required for maneuvering shall be reviewed to ensure that various transfer techniques can be accommodated.

9.6 UNIVERSAL WASHROOMS

a) The door swing into the universal washroom shall screen and partially obstruct the line of vision to the toilet.

b) The door shall be equipped with a power-assisted door opener in conformance with **Section 6.2**.

c) Universal washrooms shall have internal room dimension that can accommodate a clear turning space of at least 1700mm.

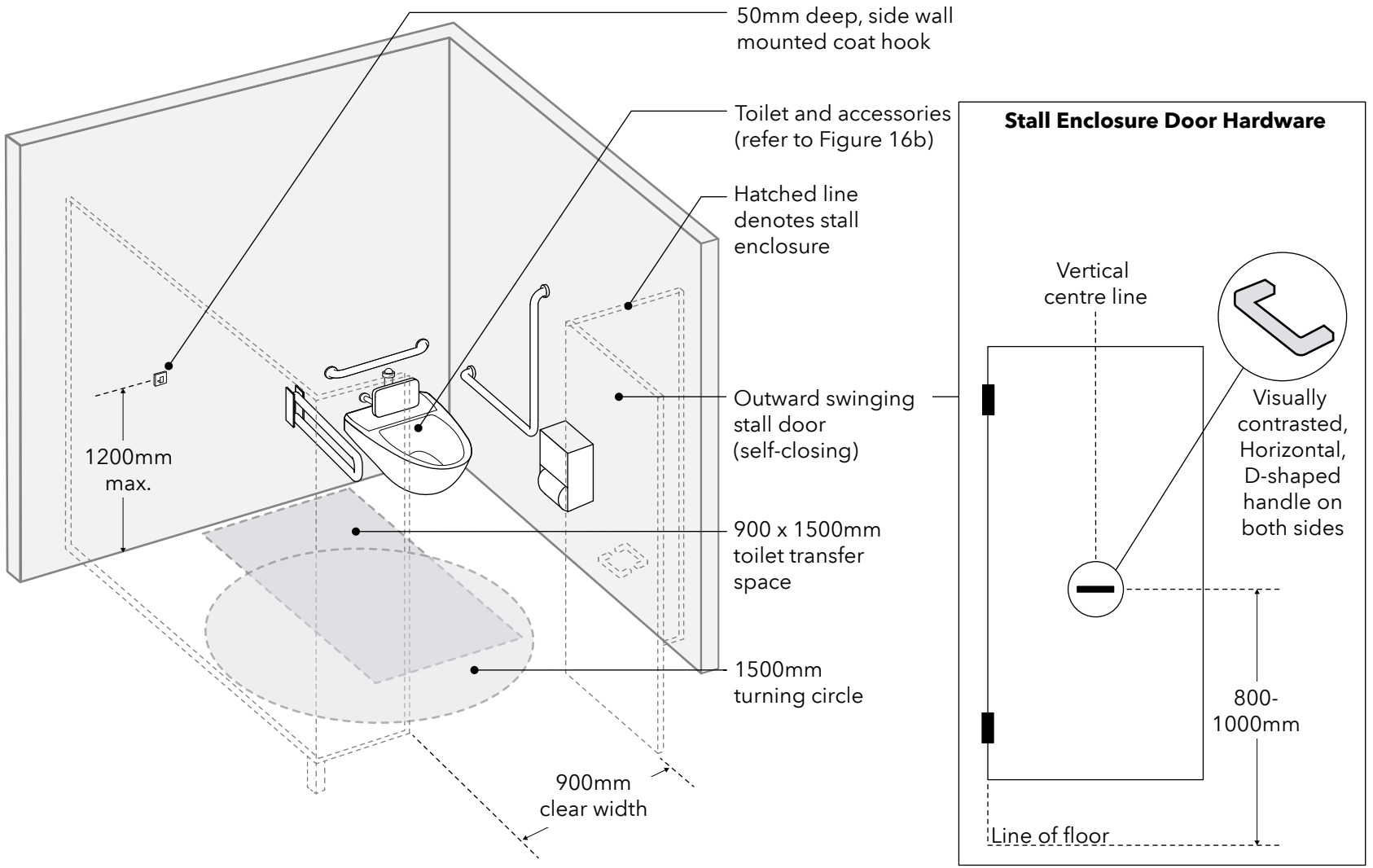

Figure 16a: Accessible Toilet Stall

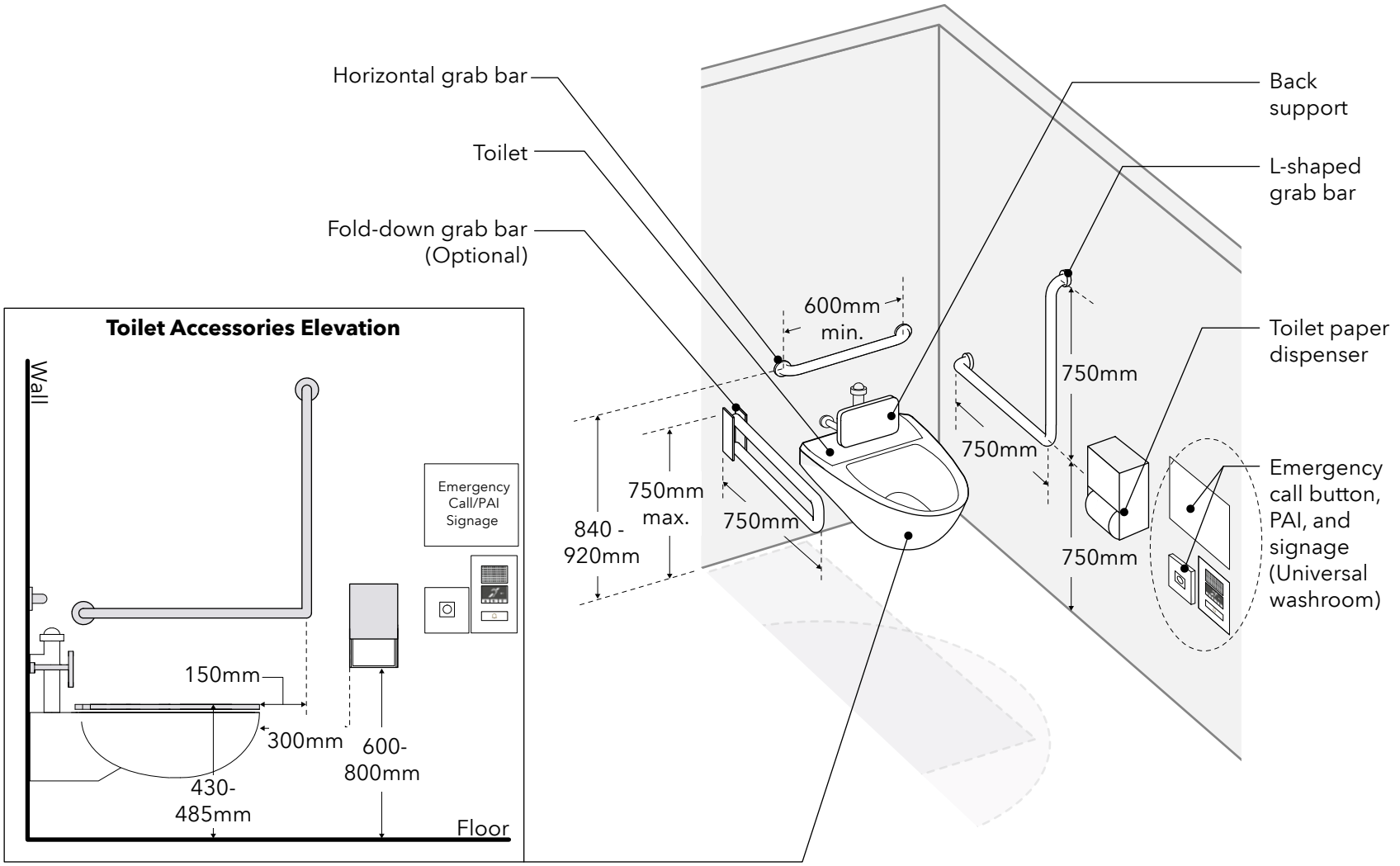

Figure 16b: Toilet and Accessories

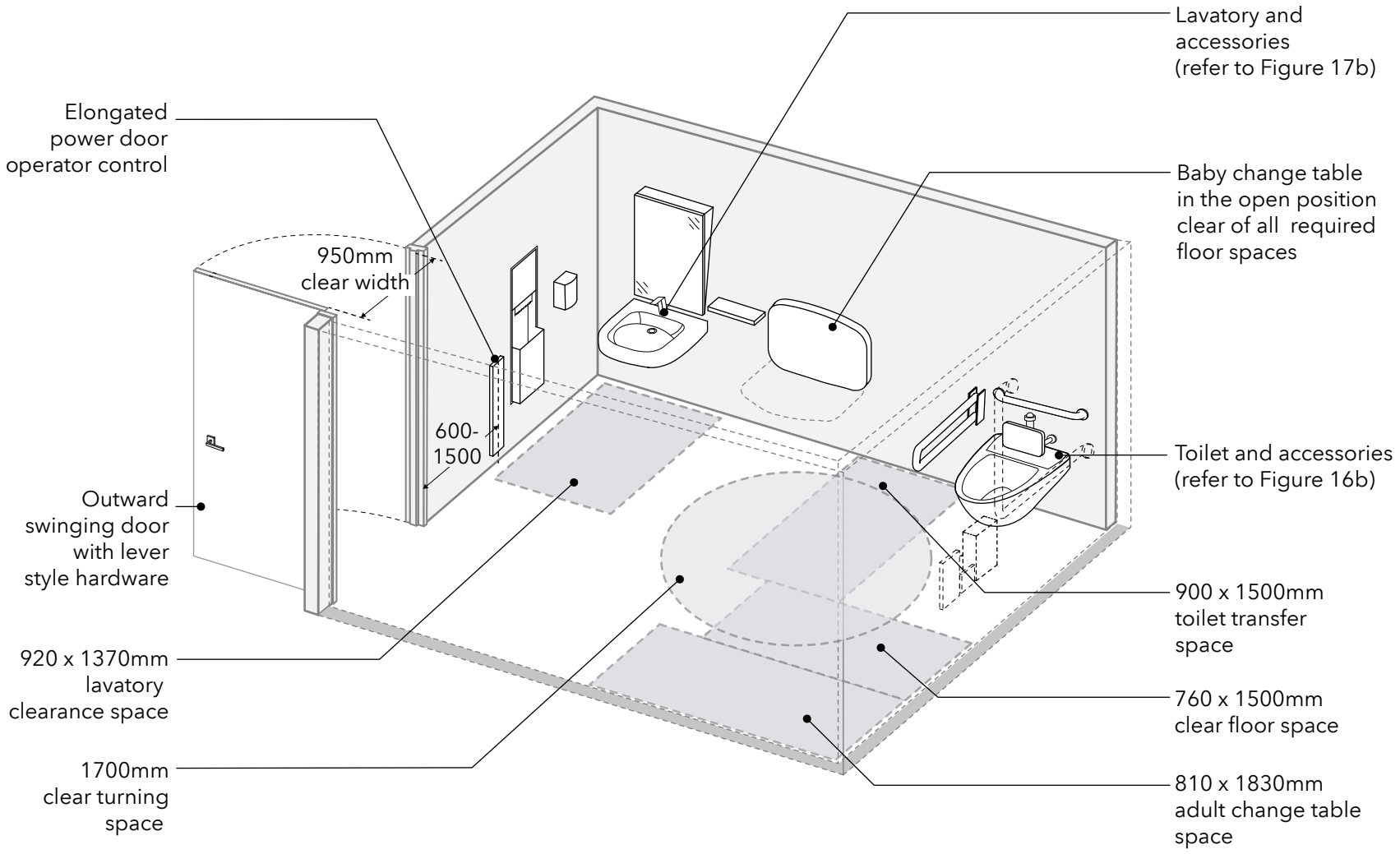

Figure 17a: Example of Universal Washrooms Layout

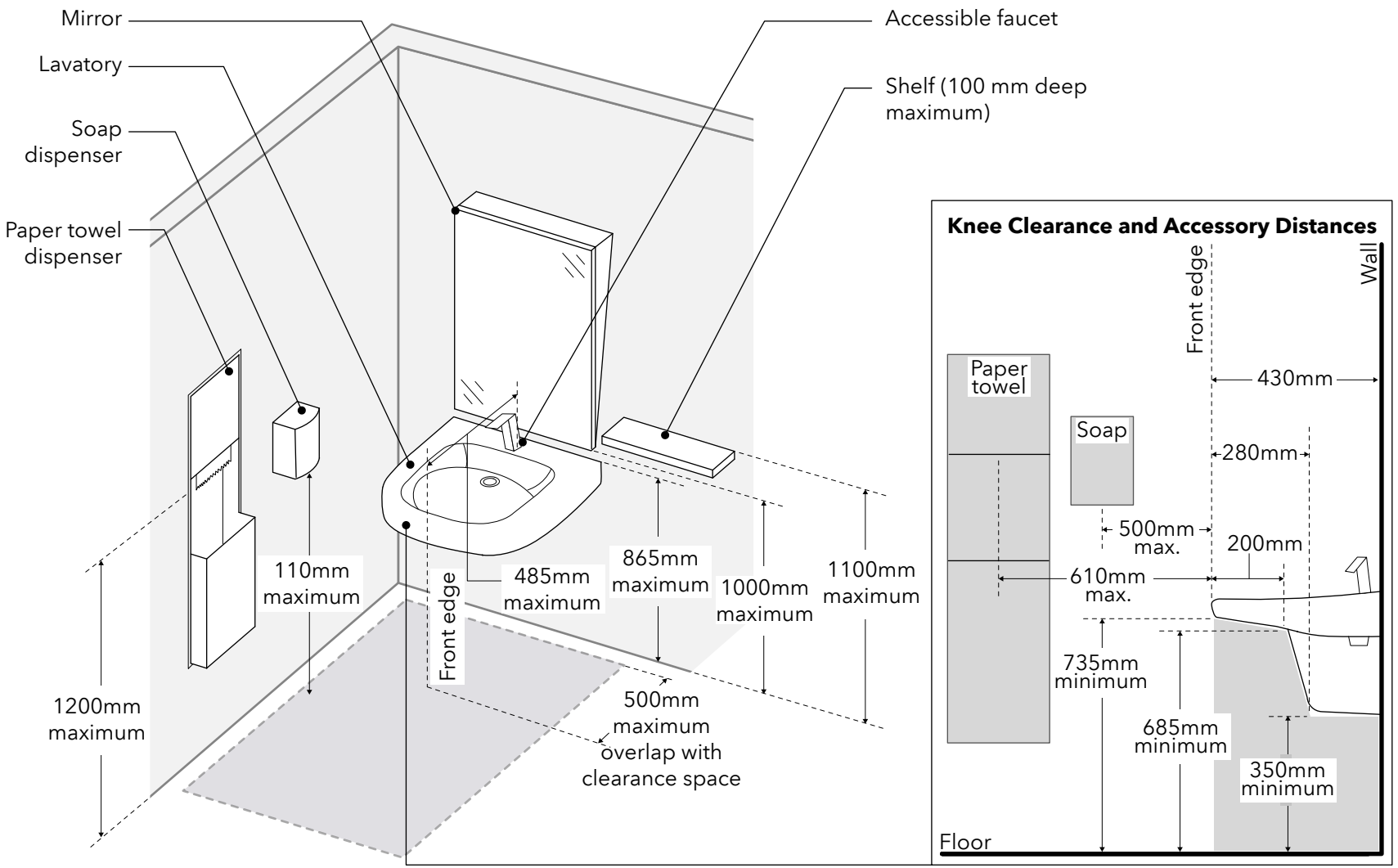

Figure 17b: Lavatory and Accessories

d) Universal washrooms shall provide an accessible toilet, sink, and washroom accessories with hands-free / touch-less operating controls.

e) All other internal dimensions shall meet those indicated within **Figure 16b**, **Figure 17a**, and **Figure 17b**. Fixtures are to be located in prescribed locations to maintain relationships for use with other aspects of the washroom and other fixtures and shall not deviate from the requirements.

f) Where more than one universal washroom is provided, the transfer space should be located on opposite sides of the toilet, to accommodate different transferring needs.

g) Where provided, an adult change table, shall be 810mm by 1830mm and have a surface height above the finished floor that can be adjusted from between 450mm-500mm at the low range; to between 850mm-900mm at the high range.

h) A transfer space of not less than 760mm wide and 1500mm long shall be provided adjacent to the adult change table to align with the Ontario Building Code.

i) In addition to Ontario Building Code requirements for an emergency call system, a two-way intercom that complies with **Section 8.7** shall be provided in the washroom.

10 PROVISIONS FOR SERVICE ANIMALS

10.1 GENERAL PRINCIPLES

For customers with service animals, it is important that suitable accommodations are provided to facilitate the animal's health and welfare (**See Figure 18**).

10.2 GENERAL PROVISIONS

a) Service animal relief areas shall be integrated within the existing landscape design.

b) Service animal relief areas shall be located in close proximity to transport hubs, or station building, on the main accessible route and in close proximity to and visible from the main accessible entrance.

c) Service animal relief areas shall not be located on a platform.

d) A service animal relief area shall:

1. Provide a clear space of at least 6m.sq (minimum 2000mm by 3000mm) and provide maneuvering space to allow customers who use wheelchairs to turn around;
2. Be adjacent and connected to an accessible route that complies with **Section 4**;
3. Include a grassy area or compacted pea stone area;
4. Be level, firm, stable and slip-resistant;
5. Be easy to clean and permeable;
6. Allow for drainage;
7. Include a GO Standard waste bin; and,
8. Include Tactile Signage – "For service animals" that complies with **Section 8.4**.

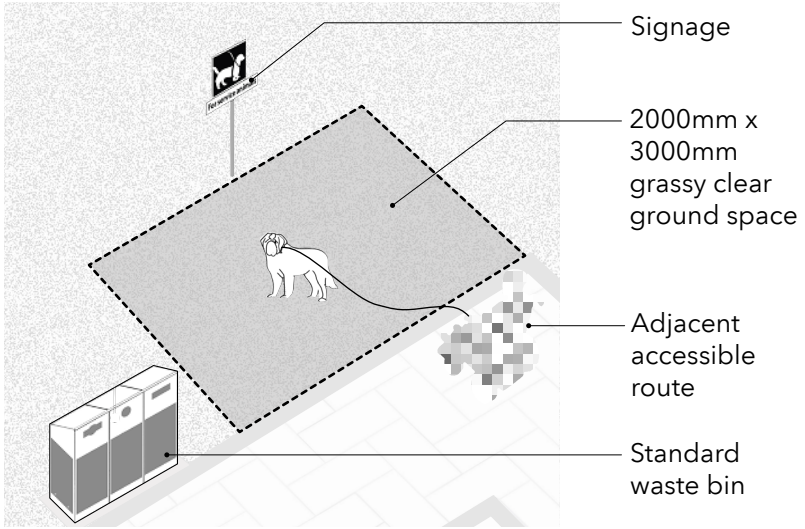

Figure 18: Service Animal Relief Area Configuration

11 BOARDING AND ALIGHTING

11.1 GENERAL PRINCIPLES

Universal design in relation to the platform and vehicle boarding is essential in creating inclusive access to the transportation system. It benefits all customers by increasing safety and improving service response by reducing the time of loading and unloading a vehicle.

Consistency across the system and over time is also important to encourage intuitive wayfinding, customer safety, and strengthen the presence of an integrated network.

11.2 ACCESSIBLE PLATFORM AND VEHICLE INTERFACES

This section includes general requirements applicable to GO Rail, LRT, Subways, UP Express and BRT platforms. Platforms and vehicle interfaces shall conform to all applicable Metrolinx Standards, as well as all applicable standards, regulations, and codes. Each standard and regulation will prescribe appropriate requirements for the mode of transportation. The appropriate design of platforms is the foundation that ensures accessibility, convenience, and safety of customers with disabilities when boarding and alighting vehicles.

a) Platforms shall be located to minimize travel distances to adjacent transit modes, major arrival areas and accessible route. Refer to GO Design Requirements Manual for precise GO Rail platform orientation, design and alignment requirements.

b) Step-free access from platform to vehicle shall be provided. For GO Rail platform barrier-free access to the trains is provided by an accessible elevated "mini-platform" which is aligned with the designated accessible rail car. Refer to Mini-Platform GO Standard Drawings and Specifications for mini-platform details.

c) When level boarding is provided, the horizontal gap between the platform edge and stationary vehicle shall be no more than 76.2mm (3 inches).

d) For a non level boarding condition, the platform shall have an accessible boarding location with a Designated Waiting Area complying with **Section 13.3** and two-way intercom complying with **Section 8.7** in close proximity.

e) Sufficient clear ground surface space shall be provided on platforms to facilitate maneuvering to and from the vehicle at the boarding point along the accessible path of travel for waiting customers. (**See Figure 19**). Refer to GO Design Requirements Manual for minimum GO Rail platform clearances and usable platform area.

f) A safety-yellow coloured, tactile attention indicator (truncated domed) shall be provided continuously along platform edge, and shall:

1. Be parallel to the platform edge;
2. Be installed with one side flush with the platform edge;
3. Be limited to customer facing areas of the platform; and,
4. Be designed in accordance to **Section 8.3**.

g) Platform fixtures and furnishings shall be clustered, where possible to clearly identify points of information to avoid the perception of clutter and maximize usable platform area.

h) Ends of platforms shall be protected and clearly demarcated to customers who have sight loss, by installing a railing or gate located within the detection range of a long white cane. Persons using a long cane can detect objects in their line of travel if their lowest leading edge is at or below 680mm from the floor. A railing or gate at the ends of platforms shall afford the minimum clearances for train envelopes as per Metrolinx Standards.

11.3 PASSENGER SHELTERS

a) Passenger shelters shall be a minimum depth of 1800mm to allow adequate space for circulation. A 2000mm depth is preferred, where possible. Refer to

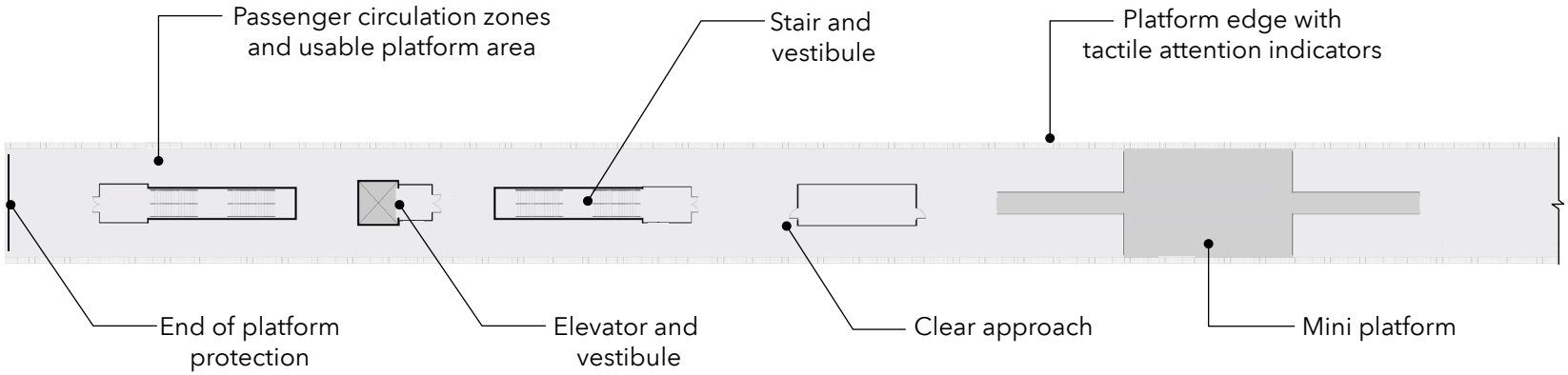

Figure 19: GO Rail Platform Adjacencies

GO Transit Standard Drawings and Specifications for GO Shelters.

b) A minimum clear 1500mm turning diameter shall be provided inside all passenger shelter typologies.

c) There shall be no advertising decals on glazing on any shelter or enclosure in the station environment within 1800mm above finished floor.

11.4 BUS STOP AND TERMINAL ACCESSIBILITY

a) Bus boarding and alighting areas shall have a firm, stable surface and be clear of any landscape and streetscape elements.

b) Bus boarding and alighting areas shall be connected to streets, sidewalks, or pedestrian paths by an accessible route that complies with **Section 4.3**.

c) The curb height at boarding and alighting points shall be suitable for the type of vehicle it serves, allowing step-free access onto the vehicle. The curb shall contrast visually with the remainder of the pavement to allow for easier identification.

d) A clear accessible area 3135mm wide from shelter structure to the face of curb and 6415mm long shall be provided along the frontage of all bus boarding and alighting areas.

e) Where the vertical drop of the bus platform is less than 250mm, tactile attention indicators are not required and shall not be used, as this may be mistaken for a road crossing. If the vertical drop at a transit platform is 250mm or more, the edge shall be protected with a tactile attention indicator that complies with **Section 8.3**.

f) Bus shelters shall be designed to provide accessibility of customers using wheelchairs, climate protection, seating, scheduling, and route information.

g) Bus shelter lengths shall be designed to accommodate the type of vehicle it is intended to serve.

h) Bus shelter location and design shall enable customers to having a clear view of oncoming traffic.

i) Bus shelter shall have unobstructed glazed panels on at least three (3) sides and include 50mm vision strips that are colour/tonal contrasted with the surrounding environment. The shelter interior shall clearly be visible from the outside during day and night.

j) Where enclosed, bus stop shelters shall have a ceiling height of 2300mm from the ground level.

12 FINISHES

12.1 GENERAL PRINCIPLES

Finishes are an important part of the transit environment and can have a positive (e.g., tactile information for assistance with navigation for customers who are blind and have low vision) or negative (e.g., presence of hazards along routes that create barriers or confusion) impact on comprehension and navigation through a space.

It is therefore important that all aspects of the final design are considered together, to create a holistic environment where the visual, tactile and audible language within the transit space is complementary to one another.

12.2 VISUAL CONTRAST AND GLARE

Visual contrast is an important aspect of design, assisting customers with low vision in differentiating between different surfaces and finishes, and thereby making navigating through a building easier.

a) Potential hazards and colour contrasted strips (i.e. bumble bee strip or hazard strip) and signage shall achieve a 70 LRV points difference.

b) Large surfaces areas such as wall, floors, columns and furniture shall achieve 50 LRV points difference with their surrounding surfaces. Colour contrast requirements can be achieved through coloured bands and/or coloured concrete bases (i.e. column foundation bases). Contrasting elements must be integrated, i.e. not painted lines. For exterior surfaces, contrast should take into consideration varying weather conditions and the potential impact on contrast due to ice, snow, etc.

c) Where patterns are used on floor or wall surfaces, contrast shall be minimized (to below 20 LRV points difference) to reduce the risk of customers misunderstanding the space (e.g., stripes being mistaken for steps).

d) For door hardware (e.g. the elements and components to facilitate opening and closing doors, contrast shall be between 15 and 40 LRV points.

e) Use of colour to assist wayfinding should also be considered to assist non-written information. This will need to be in addition to other modes of information (as some customers may not be able to differentiate between colours).

f) Shiny surfaces shall be avoided as these produce glare and reflection which can disorientate customers. The Unified Glare Rate (UGRL) shall not exceed 25 for circulation areas.

12.3 WALKING SURFACES

a) Walking surfaces shall be firm and slip resistant, facilitating safe and comfortable journeys.

b) Floor patterns shall have a visual contrast of less than 20 points difference on the LRV scale.

c) Highly contrasted floor patterns can be perceived as differences in floor level, which may confuse customers who have vision loss and customers with cognitive or sensory disabilities. Highly pattered walking surfaces are not acceptable.

d) There shall be no advertising decals on walking surfaces, including the rise or run of stairs.

e) See **Section 8.3** for more information on Tactile Walking Surface Indicators (TWSI), which shall be included as part of the overall provision for sensory information within the transit environment.

13 SAFETY AND EMERGENCY

13.1 GENERAL PRINCIPLES

It is important that by providing universal access to public transport, safety is also built into the design, which includes the ability to evacuate from a space in the event of an emergency, in a safe, equitable and dignified way.

Emergency routes shall be intuitive, step-free and require minimal assistance from staff.

Wherever possible, provision of step-free routes for escape should be provided to allow customers to evacuate independently to the maximum degree possible. , For those customers who require assisted evacuation, there shall be a strategy for the provision of assisted evacuation and there may need to include areas of refuge.

13.2 AREAS OF REFUGE/AREA OF RESCUE ASSISTANCE

Areas of refuge are safe places for people to wait for assistance in an evacuation. Where an area of refuge is not required, the design is still required to consider the egress of persons with disabilities in order to support the preparation and development of the emergency preparedness plan required under the AODA. For station and terminal buildings that include exit/egress stairs, the following requirements shall be met:

a) An area of refuge shall be provided to allow customers who are unable to evacuate independently to wait in a place of safety, for assistance in an emergency. The required number of areas of refuge shall be equal to the required number of exits and/or means of egress as prescribed in the Ontario Building Code.

b) An area of refuge shall be located in the same area as the main escape core / route, in order that all customers (regardless of egress requirements) move in the same direction.

c) The minimum dimensions of an area of refuge, suitable for one wheelchair user, shall have dimensions of at least 900mm by 1500mm (**See Figure 20**).

d) There shall be two areas of refuge for each egress stairs.

e) A two-way communication system (enhanced passenger assistant intercom) in compliance with **Section 8.7**, allowing customers to be kept informed of the situation, shall be provided for each area of refuge, thus reducing anxiety and confusion for those waiting for assistance.

f) Controls for the two-way communication system shall be mounted no more than 1000mm from an inside corner and between 900mm and 1000mm above the floor.

13.3 DESIGNATED WAITING AREAS (DWA) - RAIL PLATFORM

a) Where required as per Metrolinx Standards, the DWA shall be provided on each platform, located close to an accessible boarding location, in a manner that is uniform across the network.

b) DWAs shall be weather-protected and incorporate benches and/or seats that provide back-support: some shall have armrests.

c) Where a mini-platform is provided, the DWA shall be adjacent to the mini-platform and not obstructing accessible maneuvering clearances and not to interfere with boarding or alighting from trains.

d) DWAs shall incorporate sufficient unobstructed clear space, adjacent to the seats but out of circulation routes, to accommodate mobility devices such as wheelchairs, scooters and strollers.

e) Customers seated in DWAs shall be made clearly visible through the use of enhanced lighting levels and clear sight lines to/from the platform entry/exit points and accessible boarding locations.

f) DWAs shall be identified with signage that is standardized across the network.

g) A two-way intercom that complies with requirements under **Section 8.7** shall be provided at the DWA for customers requiring assistance.

13.4 ALARMS

a) Where fire alarms systems are required, they shall have a visible and audible signal. A visual signalling component is an essential safety feature for individuals who are D/deaf, deafened or hard of hearing.

b) Visual signaling component shall be significantly brighter than the ambient light and shall be designed in accordance with applicable fire alarm standards to limit impact on customers who are sensitive to strobes (e.g., it is paramount to synchronize strobes to reduce the effect on customers with photosensitive epilepsy).

c) Fire Alarms shall:

1. Be placed so that the visual signaling component is visible throughout any enclosed space, including any enclosed spaces where customers may be isolated such as washrooms; and,

2. Not cause discomfort to customers (e.g., in stairwells where customers may be waiting for a period of time).

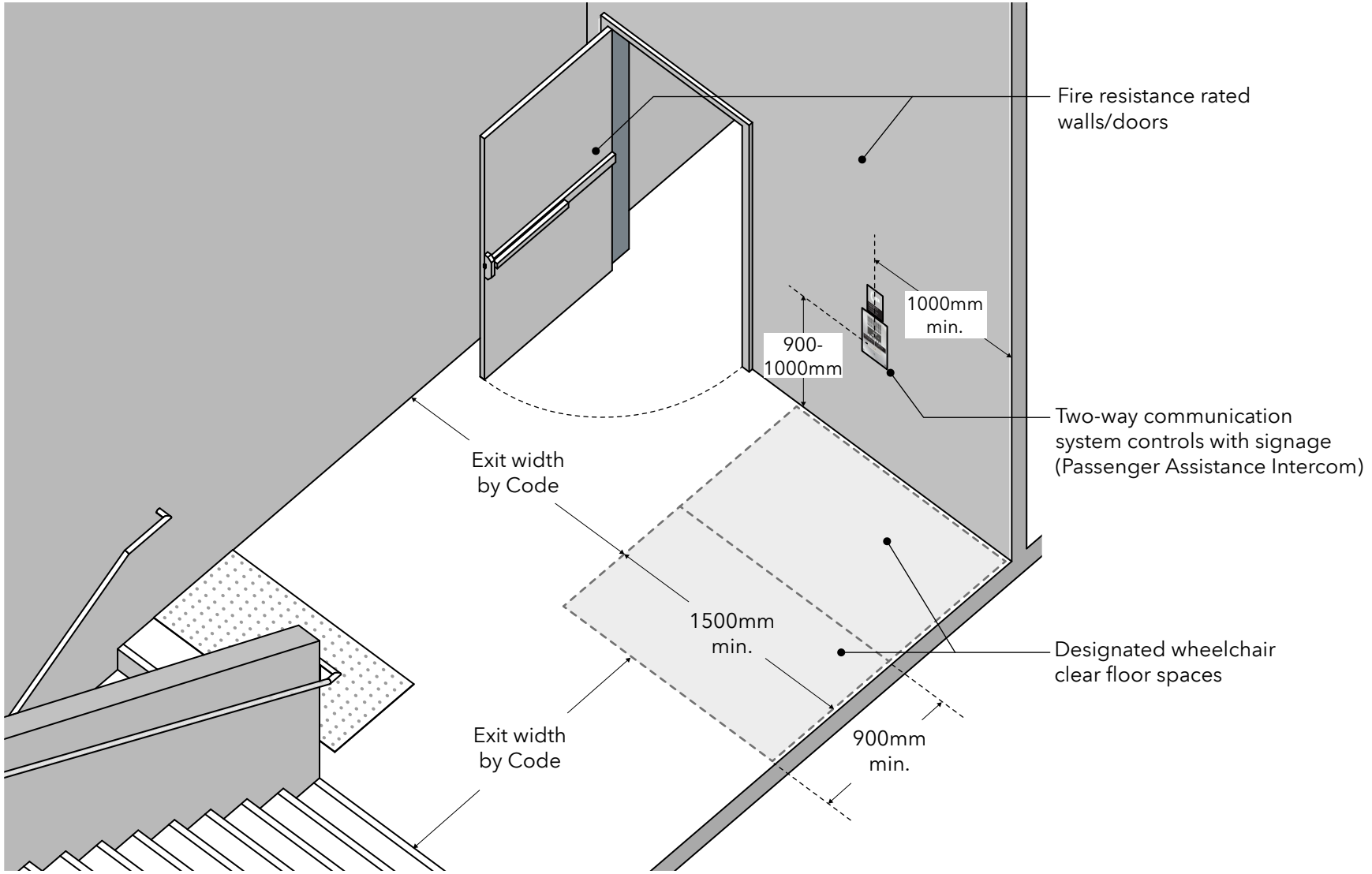

Figure 20: Area of Refuge

14 MAINTENANCE OF ACCESSIBLE ELEMENTS

14.1 GENERAL PRINCIPLES

The operation of the space and ongoing maintenance plans are essential to the universal design process. Once features are in place to facilitate access, it is important that operators are trained, and strategies are in place to allow features to be used as intended, and to avoid any barriers to access through the operation of the space.

14.2 GENERAL REQUIREMENTS

a) External routes such as steps, ramps and pathways, shall be kept clean, unobstructed and free of surface water, snow, leaves etc.

b) Car parking shall be checked regularly to ensure accessible parking spaces are not being misused by other customers, and that provisions are adequate.

c) Training shall be undertaken with staff to ensure they understand any management procedures put into place to aid customers with disabilities, including what to do in an emergency, and the importance of finding out access requirements from visitors prior to their arrival where possible (e.g., as part of a passenger assist programme, in order that this can be implemented).

d) Accessible routes and facilities shall be kept clear of obstructions such as bins, planters and storage.

e) Floor surfaces shall be checked to ensure there are no trip hazards (such as junctions between floor surfaces or loose flooring materials) and cleaning or polishing of finishes shall not create a slippery surface.

f) Access control systems and assistive listening systems shall be fully operational at all times, including regular checks for areas where assistive listening systems are installed.

g) Elevators shall be serviced regularly, and management procedures shall be put into place for what should happen if they are out of service, e.g. the provision of signage or notification of alternative provision.

h) In refreshment areas (e.g., food and beverage retail) with movable tables, regular checks shall be carried out to ensure there is sufficient space to move between them and assistance shall be available when needed.

i) Washrooms shall be regularly checked and maintained by identified personnel within the operator organization, including general cleanliness, checking seats and grab-rails are securely fixed and any drop-down rails are in working order, and tap nozzles are cleaned for correct water flow.

j) Emergency call systems within universal washrooms shall be kept in working order at all times. A

management procedure shall be put in place to indicate how responses will be dealt with in relation to alarm calls from washrooms.

k) Where outlets are provided (e.g., within waiting areas), these shall adhere to the reach ranges contained in **Section 1**.

l) Doors, door closers, hardware and door opening forces shall be checked regularly to ensure they are within acceptable limits.

m) Accurate information on facilities shall be made available to customers prior to arrival. Regular update of maps and / or literature shall be undertaken as and when changes occur. Public website shall identify accessible stations and terminals, including a list of accessible amenities, hours of operations and staffing hours, and alternative mode of transit and/or alternative path of travel when stations are closed, or when accessibility features are not available.

n) Mitigation measures shall be identified for any powered features (e.g., automatic doors, elevators, etc.) in the event of a power failure.

o) Where elevators cannot be monitored (e.g., in unstaffed areas) then an alternative strategy for assistance and security shall be identified by the operator. This includes planning for:

1. Continued step-free access after-hours (including elevators which are located within the public realm and delayed services);
2. Signage clearly communicating how report elevator outages and how to request assistance;
3. Consideration of virtual/remote monitoring to reinstate as/when required and allow real-time response; and,
4. Coordination with the fire evacuation plan.

15 ACCESSIBILITY DURING CONSTRUCTION

15.1 GENERAL PRINCIPLES

This section applies when customers and the wider public will be affected by construction of new or redevelopment of existing Metrolinx infrastructure.

The Contractor undertaking the construction shall prepare a plan of how they will provide a safe and accessible path of travel for all users through and/or around the construction site. The plan shall ensure that all users will be accommodated either through or around the construction site, minimizing the risk of dropping ridership numbers.

15.2 GENERAL REQUIREMENTS

a) Identification of alternative accessible paths for users shall be provided where existing paths need to be closed or are restricted for construction works. The design of the alternative routes shall comply with the requirements outlined in this document (in particular **Section 4**).

b) Barriers shall be installed to separate the accessible routes from the construction site (including control of debris) and shall be provided at the following locations:

1. Between existing paths that are remaining operational / alternative access routes and the adjacent construction site;
2. Between the alternate routes and adjacent vehicular roads, if the alternate route is diverted into the road (which will then also require temporary ramps to transition between the curb and the road);
3. Between the alternate route and any hazards; and,
4. To block off any routes which are unavailable, to avoiding customers entering dead-ends / being stranded.

c) Warnings and signage shall be provided to alert customers of the presence of the construction site and its relative hazards, and to direct them to the accessible alternative route. Signage shall be designed in accordance with the requirements outlined in **Section 8.2**.

d) The contractor shall ensure that no construction materials are stored or placed on the path of travel.